THE IRON TRADE REVIEW

Volume XLIX CLEVELAND, DECEMBER 14, 1911 Number 24

Higher Prices Named on Wire, Sheets and Bars

Steel Corporation Makes Good Showing and Expects to Increase Capacity in Operation—Pig Iron Still Selling at Low Figures

The trend of events continues in the right direction and hopes of greatly increased buying by the railroads are apparently well founded. In some places, however, especially at eastern mills, improvement is slow and plants are being operated at only from 50 to 60 per cent of capacity. In the Pittsburgh district, capacity in operation is increasing. The Steel Corporation throughout the country is making an excellent showing. Its bookings this month are heavier than in November, exceeding 50,000 tons daily. It expects to be operating 85 to 90 per cent of capacity soon. The Columbus plant of the Carnegie Steel Co., which has been idle more than a year, will resume about Jan. 1. The earnest efforts of mills to obtain higher prices on finished products have continued with considerable success, but whether some recent advances have been justified has not been fully determined.

Pig Iron

Buying of pig iron has continued in good volume, but low prices still prevail. A purchase made by the Jones & Laughlin Steel Co., for its Aliquippa plant, has caused much discussion. There has been some confusion as to the price paid, due, in part, to the varying freight rates from different furnaces to the Aliquippa plant. It is known that furnaces which made bids netting them from $12.15 to $12.25 at their plants, did not take the order, but furnaces having less than valley rates figured in the transaction. It is understood that the same company has offered to take additional tonnage at the same figure. The American Rolling Mill Co. is still figuring on from 10,000 to 15,000 tons of basic. Stove manufacturers in the Detroit district purchased 10,000 tons of foundry grades for next year's delivery. A sanitary interest at Pittsburgh has purchased 4,000 tons. Sales of all grades in the Buffalo district aggregated from 25,000 to 30,000 tons, and prices are firmer in that market. About 30,000 tons of southern iron were sold for western delivery, and $10, Birmingham, now seems to be the minimum for No. 2. The Corporation has not yet closed on its large inquiry for ferro-silicon and probably will not settle the matter for several weeks.

Sheets

For some time past, the sheet market has been in a thoroughly unsatisfactory condition from the standpoint of the seller. Considering cost of manufacture, the lowest prices in the history of the trade have prevailed and buying has been of the hand-to-mouth order. Recently there have been some signs of improvement and mills have just announced new quotations of 1.40c, Pittsburgh, on blue annealed No. 10, 1.90c, on black No. 28, and 2.90c, on galvanized No. 28, which quotations are $1 a ton over the ordinary prices recently made and $2 above lowest quotations. Similar conditions have prevailed in regard to wire products, on which an advance of $1 a ton has been announced. How these advances will be received by consumers, remains to be developed. In other lines, especially bars, plates and shapes, efforts to obtain the higher quotations recently announced have met with considerable success, but occasionally concessions are made on business which was pending before the advances were made. The Republic Iron & Steel Co. has marked up the price of steel bars from 1.10c to 1.15c, Pittsburgh, for December shipment and other leading bar makers have followed the Republic's lead.

Railroad Buying

Railroads have evidently determined not to grant any requests for lower freight rates on iron and steel products and raw materials. It has definitely been decided not to grant the petition of the Shenango and Mahoning valley interests for lower rates from the lake on raw materials, and southern pig iron manufacturers, who desired reduction on freight rates on pig iron to the north, have been given no encouragement. Valley manufacturers will probably appeal to the interstate commerce commission. The Pennsylvania railroad is now in the market for 17,000 70-ton freight cars and is considering the advisability of buying a very much larger number, if it can do so at present prices. Car builders, however, are not disposed to contract for many more cars without advancing their prices. Rail business is developing slowly, but it is confidently expected that heavy tonnages will be placed by the Pennsylvania and New York Central within a few days. The Northern Pacific is about to close on 40,000 tons of rails. Car orders placed by western roads aggregate 5,500, of which 3,000 were placed by the Missouri Pacific. The Chicago & Northwestern has ordered 600 auto cars and 500 flat cars. The Soo line is in the market for 750 box cars.

WORLD'S IRON MARKETS

PITTSBURG

Heavy Tonnages Booked, While Prices of Finished Lines Harden.

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Dec. 12.

The improvement in the local finished steel market during the past week has been more pronounced that at any time in months, as the mills have booked heavy tonnage at higher prices. In the case of plates, shapes, steel bars and sheets, the advance in prices, instead of checking the flow of orders, has brought out heavier tonnage, as is evidenced by the starting of additional mills which had been inactive for a long period. The fact that the volume of business is steadily increasing and that mills are obtaining higher prices at this time, when buying usually tapers off on account of the holiday season and the inventory taking period, strongly indicates a return of confidence on the part of both buyers and sellers.

On Monday, the leading interest and independents advanced prices on wire products $1 a ton. There has been another advance of $1 a ton on steel bars and bands for immediate shipment; prices of plates and structural steel have been advanced $1 a ton, as compared with the level two weeks ago, and the leading sheet makers have advanced prices $1 to $2 a ton, compared with quotations made early in November. Some mills have quoted 1.20c on steel bars and 1.25c, Pittsburgh, on plates and shapes for second quarter shipment.

That the lull in car buying on account of the withdrawal of low prices by car builders is only temporary is shown by the fact that the Pennsylvania has increased its written inquiry to cover 17,000 freight cars. Reports of the number of cars the company likely will purchase range from 20,000 to 60,000 cars, on which deliveries will extend over two or three years. The New York Central and Pennsylvania systems have sent out tentative inquiries for 1912 steel rails and are expected to purchase about 250,000 tons each. Bids are going in on 26,700 tons of plates for the two proposed new battleships. The largest transaction in pig iron was the purchase of basic by the Jones & Laughlin Steel Co., for Aliquipa. The company is known to have purchased about 40,000 tons at a low price and in some quarters the statement is made that the company purchased double this amount.

The Jones & Laughlin Steel Co., within the next few weeks, will start its four new open-hearth furnaces at Aliquippa with a capacity of upward of 30,000 tons a month; a new unit of 12 tin mills, completed recently, blooming mill, billet and sheet mill, and new wire mills at Aliquippa. The American Sheet & Tin Plate Co., on Dec. 18, will start its 25-tin-mill plant at Monessen, Pa., and increase operations in the New Castle and Sharon, Pa., districts 25 per cent by operating all of its 70 tin mills in that section.

Pig Iron.—The largest transaction in this market during the week was the purchase of basic pig iron by the Jones & Laughlin Steel Co., for delivery at Aliquippa, Pa., early in the new year. There has been considerable secrecy surrounding this transaction. In well informed circles it is stated that the company purchased about 40,000 tons from two or three furnace interests at $12.10, valley, while from other sources it is stated that the company purchased from 75,000 to 80,000 tons. This deal has given the market a firmer tone and today the general asking price is $12.50, valley, although no straight sales have been reported above the price paid by the Jones & Laughlin Steel Co. An Allegheny valley steel interest has taken 1,000 tons of basic in an exchange transaction, and the American Rolling Mill Co. is still figuring on 10,000 to 15,000 tons, as stated last week. The foundry market has settled to $13, valley, for prompt and first quarter shipment, a sanitary interest north of Pittsburgh having taken about 4,000 tons at this figure. Several of the larger consumers of foundry iron have not yet covered for first quarter requirements. One seller reports two sales of malleable iron, aggregating 2,000 tons at $12.75, valley, while another furnace sold 500 tons of low manganese malleable at $13, valley. There has been a sale of 500 tons of Bessemer to a local interest at $14.25, valley. We quote the market as follows:

(Prompt Shipment.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, valley	12.25
Basic, Pittsburgh	13.15
No. 2 foundry, Pittsburgh	13.90
Gray forge, Pittsburgh	13.40
Malleable, Pittsburgh	13.65

(First Quarter.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.15
Basic, valley	12.50
Basic, Pittsburgh	13.40
No. 2 foundry, Pittsburgh	13.90
Gray forge, Pittsburgh	13.65
Malleable, Pittsburgh	13.65

Ferro-Alloys.—Recent advances in prices on 50 per cent ferro-silicon have brought out more inquiry for forward delivery. Bids have gone in on 6,000 tons for various plants of the United States Steel Corporation and 600 for a central Pennsylvania steel company, but no sales have been made at a higher price. There is also more inquiry for ferro-manganese, but little actual buying is reported.

We quote ferro-manganese at $38.50 Baltimore, for prompt and forward delivery. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $70, Pittsburgh, for prompt and forward delivery; 12 per cent, $22.50 to $23; 11 per cent. $21.50 to $22; 10 per cent. $20.50 to $21, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—This market has shown a decided improvement during the past 10 days, and there is more material moving even at the higher prices being quoted by practically all mills. The leading interest and some of the larger independent plate mills are operating to capacity and have considerable business on their books for forward delivery. The minimum quotation on plates for prompt shipment today is 1.15c, Pittsburgh, and for deferred delivery mills are asking 1.20c to 1.25c. Some business has been placed at 1.20c, Pittsburgh, for first quarter shipment. Car awards in the Pittsburgh territory during the past week include 300 coal cars for the Burwin White Coal Co., to be built by the Cambria Steel Co.; 600 additional automobile cars for the Chicago & Northwestern railroad, to be built at the western plant of the Pressed Steel Car Co., and 500 additional flat cars for the same road, to

be built by the Standard Steel Car Co. The Pennsylvania railroad has increased its inquiry to cover 17,000 cars and reports of the number of cars the company is likely to buy range from 20,000 to 60,000 cars. The Harriman lines and other roads are also figuring on large orders for cars. The temporary lull for car buying in the eastern territory is reported to be due to the fact that steel car builders have advanced prices approximately $100 a car. Bids are going in on the two proposed new United States government battleships, which will involve a total of 27,600 tons of plates and other material. Bids are also going in on 10,000 to 20,000 tons of plates for riveted pipe work in Canada. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.15c to 1.20c. Extras are as follows, per 100 **pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates,** 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including ¼-inch plate on thin edge, 0.10c; under ¼ and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—The sheet market, which has been in a very unsatisfactory condition for some months, is firmer, and some mills are quoting higher prices. The larger companies are now quoting 1.90c, Pittsburgh, on black sheets, No. 28 gage, and 2.90c, Pittsburgh, on galvanized sheets No. 28 gage, as the absolute minimum, and the lower quotations are gradually being withdrawn by the smaller mills, so that the market is quotable at $1 a ton higher price than ten days ago. A large amount of business has been booked during the past ten days and buyers are showing a disposition to cover as far ahead as possible, but the mills generally are quoting only for first quarter delivery. Some of the independent plants are running at 100 per cent of capacity. We quote the market as follows, with $1 a ton added as the delivered price in the Pittsburgh district:

Blue annealed sheets No. 10 gage, 1.40c; black annealed sheets No. 28 gage, 1.85c to 1.90c; galvanized sheets, No. 28 gage, 2.85c to 2.90c; painted roofing sheets, $1.35 per square for No. 28 gage, 2½-inch corrugation; galvanized roofing sheets, $2.50 per square for No. 28 gage, 2½-inch corrugation, f. o. b. Pittsburgh.

Tin Plate.—A large number of additional tin mills will be started within the next week or ten days, as a number of the larger buyers of tin plate have sent in specifications against contracts previously made for first quarter shipment. The McKeesport Tin Plate Co. recently put on additional mills and is now operating all of its 22 tin mills at McKeesport, Pa. The leading interest on Dec. 18 will start its 25-mill plant at Monessen, Pa., and its Sharon and New Castle, Pa., plants, containing 70 mills, will be placed in full operation. The New Castle and Sharon plants have been operating at about 75 per cent of capacity. The Jones & Laughlin Steel Co. within the next week or so will place in service its new unit of 12 tin mills at Aliquippa, Pa., completed recently. The market is firmer than for several weeks and fewer reports are heard of price concessions. We quote the market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.40 f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Steel mills have received tentative inquiries from some of the larger trunk lines for 1912 rails and formal inquiries of the Pennsylvania system and the New York Central lines, involving about 250,000 tons each, are expected any day. No particularly large awards for standard rails have been made in this district, but there has been a good run of orders for light rails for 1912 delivery. A large volume of business in standard railroad spikes and track supplies has been offered for delivery next spring. Some mills have rejected orders for railroad spikes offered at $1.40, Pittsburgh, although this price can still be done. The market is quoted as follows, the base price on open-hearth steel rails being 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.16c, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.20c to 2.25c, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9/16	$1.40
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x ⅝	.20
3, 3½, 4 and 4½ x ⅝	.30
2½ x ⅜	.40
2½, 3 and 3½ x ⅝	.60
2 x ⅝	.80

Steel.—There is more activity in this market and prices are decidedly firmer than ten days ago. Contracts are now being made for first quarter shipment, and, on account of the liberal specifications for sheets and tin plate, some consumers have specified liberally against contracts for sheets and tin bars. Some mills are not quoting below $19.50, Pittsburgh, on Bessemer and open-hearth billets and $20.50, Pittsburgh, on Bessemer and open-hearth sheet bars, but these figures are still being shaded 50 cents a ton by some mills. Quotations on billets and sheet bars follow:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $19 to $19.50, with the usual extras for size and analysis, and open-hearth rolling billets, $19 to $19.50; Bessemer sheet and tin bars are quoted at $20 to $20.50, and open-hearth sheet bars are quoted at $20 to $20.50, f. o. b. Pittsburgh or Youngstown, with full freight to destination added. Forging billets are quoted at $24, Pittsburgh.

Hoops and Bands.—Low quotations on bands have been withdrawn and 1.15c, Pittsburgh, is now being quoted as the minimum. Bands were sold in November at 1.05c, Pittsburgh. Demand for hoops is fair. On the more desirable orders the mills are shading 1.30c, Pittsburgh. We quote the market as follows:

Hoops in carload lots, 1.30c, Pittsburgh; in less than carload lots, 1.40c; bands, 1.15c to 1.20c, base, with net extras as per standard steel.

Merchant Bars.—Most of the steel bar mills in this section have again advanced the price of steel bars $1 a ton and are now quoting 1.15c, Pittsburgh, as the minimum for immediate shipment and 1.20c, Pittsburgh, for forward delivery. About the middle of November, the openly quoted price was 1.05c, Pittsburgh, and in a few instances sales were made at 1c, Pittsburgh. Three of the larger companies in this section have large orders on their books for shipment over the next three months and are not promising delivery within five or six weeks. Demand for bar iron has improved slightly, but the market is not quotably higher. There is a decidedly better demand for shafting and prices are firmer, although no actual advance in prices has been made. We quote the market as follows:

Common iron bars, 1.25c to 1.30c, Pittsburgh; Bessemer and open-hearth steel bars, 1.10c to 1.20c; plow and cultivator, 1.25c; channels, angles, zees, tees, under 3 inch, 1.25c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 65 per cent off in carloads and 60 and 10 per cent in less than carloads, delivered in base territory.

Muck Bar.—There is little better demand for muck bar, but prices are unchanged. We quote muck bar at from $27.50 to $28, Pittsburgh.

Structural. — Local structural mills and fabricating shops are operating on a very satisfactory schedule as a result of heavy structural awards both east and west of Pittsburgh, although comparatively few important contracts have been placed in the im-

mediate Pittsburgh district. The Riter-Conley Mfg. Co. has been awarded contracts for the Mond Nickel Co.'s plant, Northern Ontario, which will require 2,000 tons of steel, and gas oil tank work in Mexico, involving 3,000 tons of steel. The steel for this work will be furnished by the leading interest. The Henry Shenk Co., Pittsburgh, has been awarded a contract for the Lawrence hotel, Erie, Pa., involving 1,000 tons of steel, which will be furnished by the Buffalo Construction Co. Heavy structural tonnage will be involved in proposed grade crossing elimination work of the Pennsylvania railroad at Wilkinsburg, Pa., and the proposed new subway for Pittsburgh, but it is not likely that bids for this work will be invited until some time next year. Higher prices are being quoted on structural steel. The minimum today is 1.15c, Pittsburgh, for prompt shipment and on future delivery business mills are quoting 1.20c, Pittsburgh. We quote the market as follows:

Beams and channels, 15 inches and under, zees, 1.15c to 1.20c; tees, 1.15c to 1.20c; angles, from 3 to 6 inches, 1.15c to 1.20c; over 6 inches, 1.25c; universal and sheared 1.15c to 1.20c; over 15 inches, 1.25c to 1.30c, plates, 6¼ inches wide and wider, 1.25c.

Merchant Pipe.—There is a large amount of business in iron and steel pipe appearing. Bids have gone in on about 140 miles of 12-inch steel pipe for the Southern Gas Co., Cal., and a large specification for Canadian shipment on which awards likely will be made before the end of the week. A local gas interest has placed a large order for from two to 12-inch steel line pipe. The new discounts on merchant steel pipe are being maintained. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified being offered in from ⅛ to 6 inches:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼ inch	74	54	68	48
⅜ inch	75	65	69	59
½ inch	78	68	72	62
¾ to 1½ inch.....	81	73	75	67
2 to 3 inches.....	82	75	76	69
	Lap weld.			
2 inches	79	72	72	65
2½ to 4 inches.....	81	72	74	67
4½ to 6 inches....	80	72	73	65
7 to 12 inches.....	77	68	71	61
13 to 15 inches.....	55	..	47	..
Extra Strong, Plain Ends.				
	Butt weld.			
⅛, ¼, ⅜ inch.....	70	60	65	55
½ inch	75	69	70	64
¾ to 1½ inch.....	79	73	74	68
2 to 3 inches	80	74	75	69
Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	76	70	71	65
2½ to 4 inches.....	81	74	74	67
4½ to 6 inches.....	77	71	72	66
7 to 8 inches.....	70	60	65	55
9 to 12 inches.....	65	55	60	50
Double Extra Strong, Plain Ends.				
	Butt weld.			
½ inch	65	59	60	54
¾ to 1½ inch.....	68	62	63	57
2 to 3 inches	70	64	65	59
Double Extra Strong, Plain Ends.				
	Lap weld.			
2 inches	66	60	61	55
2½ to 4 inches.....	68	62	63	57
4½ to 6 inches.....	67	61	62	56
7 to 8 inches.....	60	50	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—There is a better demand for both merchant and locomotive boiler tubes and some fair sized orders have been placed, but some irregularity in prices is still noted. Official discounts on steel and charcoal iron boiler tubes in carload lots follow:

Steel:

1¾ to 2¼ inch.....	65
2½ inch	67½
2¾ to 3¼ inch.....	72
3½ to 4½ inch.....	75
5 and 6 inch.....	67½
7 to 13 inch.....	65

Charcoal Iron:

1½ inch	48
1¾ to 2¼ inch.....	50
2½ inch	55
2¾ to 5 inch.....	60

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Products.—The leading interest and independents on Dec. 11 advanced prices on wire products $1 a ton and announced that the new prices will apply only on business for delivery within 60 days from receipt of order. On the new card, wire nails are quoted at $1.55, Pittsburgh, and plain wire at $1.35, Pittsburgh. The market level today is still $3 a ton below the quoted prices in January and $5 below the market level in March, which was the high point of the year. The year opened with wire nails and plain wire at $1.70 and $1.50, Pittsburgh, respectively. On Jan. 20, prices were advanced $1 a ton. There was another advance of $1 a ton on March 4, and on June 20, there was a general reduction of $2 a ton. During the latter part of August, prices were reduced $1 a ton, and a similar reduction was made late in October. Early in November, prices were reduced another $1 a ton and during the latter part of November a further concession of $1 a ton became general. While conditions surrounding the market on wire products have been unsatisfactory during the past few months, there has been a decided increase in buying during the past few weeks. We quote the market as follows:

Wire nails, jobbers, carload lots, $1.55; retailers' carload lots, $1.60; cut nails (western makers), jobbers' carload lots, $1.50; painted barb wire, jobbers' carload lots, $1.55; retailers' carload lots, $1.60 with 30c for galvanizing; plain wire to jobbers in carloads, $1.35; and to dealers, in carloads, $1.40; polished staples, $1.55; galvanized staples, $1.85.

Wire Rods.—There is little better demand for wire rods, but the market is not showing much life. Some contracts have been made for first quarter. We quote Bessemer and open-hearth wire rods nominally at $25, Pittsburgh.

Coke.—Additional furnace interests are figuring on their coke requirements over 1912 and some awards will be announced within the next few days. Prices on prompt furnace coke are decidedly firmer than at any time in months and $1.60, ovens, now represents the market level, scattered lots having been sold during the week at this figure. Some operators are holding for $1.65, ovens. The higher price for prompt furnace coke is due chiefly to unsatisfactory labor conditions in the Connellsville region. Production last week showed a loss of 14,862 tons, as compared with the preceding week. The decrease was evenly divided between furnace and merchant interests. Several fairly large contracts for foundry coke for first half of 1912 have been made at $2.10 to $2.25, ovens. We quote standard Connellsville furnace coke for prompt shipment at $1.60, ovens; $1.65, ovens, for first half and $1.65 to $1.75, ovens, for shipment over the 12 months beginning Jan. 1. On high grade Connellsville foundry coke, we quote from $1.90 to $2, ovens, for prompt shipment and from $2 to $2.25, ovens, for forward delivery. The Connellsville *Courier's* figures for the week ending Dec. 2, show 26,172 active ovens with an output of 315,931 tons, compared with 27,255 active ovens and a production of 330,793 tons the previous week.

Old Material.—Various grades of old material have sold at an advance of from 25 to 50 cents a ton during the past week. Sales have been confined chiefly to small lots. Dealers and producers expect a greater demand in the near future and look for higher prices. The embargo against shipments of heavy melting steel to Monessen, Pa., is still effective. Buyers find it difficult to buy heavy melting steel at $12.25 to $12.50, although odd lots have been picked up at these figures. We note an advance of 50

cents a ton on re-rolling rails and No. 1 wrought scrap and an advance of 25 cents a ton on old car wheels, cast borings and machine shop turnings. We quote, gross tons, delivered in the Pittsburgh district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee as follows:

Heavy melting scrap	$12.25 to 12.75
Rerolling rails	12.75 to 13.00
Malleable	11.50 to 12.00
Bundled sheet scrap	10.00 to 10.50
Iron axles	20.00 to 21.00
Old iron rails	14.00 to 14.50
Stove plate	9.00 to 9.50
No. 1 wrought scrap	12.50 to 12.75
Old car wheels	12.50 to 13.00
Low phosphorus	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Cast borings	8.50 to 9.00
No. 1 cast scrap	12.50 to 12.75

CHICAGO

Heavy Buying of Southern Pig Iron —Prices Firmer.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Dec. 12.

Heavy buying of pig iron, particularly southern foundry grades, and continued improvement in finished steel, were the chief features of the market in the west during the past week. As a result of the large movement of southern iron, the price has stiffened perceptibly, but there is no change in the quotations on northern foundry or malleable. Fabricating contracts reported in the west last week will require 8,474 tons of plain material, which is considerably in excess of the tonnages that have been reported for several previous weeks. This includes 6,000 tons for the Hub building, Chicago, which, it is expected, will be let to the Vierling Steel Works. Car buying, although somewhat less in volume, continues to be one of the features of the market. Orders for a total of 5,558 cars were placed by western railroads during the week, including 3,000 purchased by the Missouri Pacific from various makers. Prices in general show very little change, although plates and structurals are very firm at 1.30c, Chicago, with $1 a ton additional being asked for contracts running up to April 1. For contracts covering the whole first half, some mills are asking an advance of $2 a ton and others are refusing to commit themselves beyond the first quarter.

Pig Iron.—Fully 30,000 tons of southern iron were sold in western territory during the past week. Practically all of it is for delivery over the first half of next year and the price for strictly No. 2 grade was $10 in most cases, although some furnaces were able to get a slight advance, owing to special circumstances. The price of $9.75, Birmingham, has almost disappeared from the market and it is doubtful whether this can now be done except for small tonnages involving immediate shipment and immediate payment. The M. Rumely Co., La Porte, Ind., purchased 1,000 tons of southern iron for first half delivery. A Rockford sewing machine manufacturer bought 450 tons and a Chicago stove manufacturer purchased 2,000 tons of southern iron grading No. 2 and No. 3. Fair tonnages of northern foundry and malleable were also sold last week, but the prices of these grades have not been influenced by recent transactions.

The following prices represent the market for Chicago delivery, except northern foundry No. 2 and malleable Bessemer made in local furnaces, which are quoted f. o. b. furnace:

	Shipments. This year.	First half.
Lake Superior charcoal	$16.50	$16.50
Northern fdy. No. 2	14.00	14.00
Southern fdy. No. 2	14.35	14.60
Southern silv'r's., 5 per cent silicon	15.60	15.60
Jackson Co. silv'r's., 8 per cent	17.40	17.40
Malleable Bessemer	14.00	14.00
Alabama basic	14.35	14.35

Billets.—Concerns making car forging are specifying liberally and the market is in a moderately active state. Sellers are not anxious to make contracts beyond the first quarter. We quote, open-hearth forging billets, $25 to $26, Chicago; re-rolling billets, $22.

Merchant Bars.—Competition for iron bars continues keen and some very low prices have been made recently. On attractive orders, 1.12c, Chicago, has been shaded about 25c a ton. Sales of steel bars have improved and the price is also somewhat stiffer. In the outlying territory, west and north of Chicago, steel bars are generally moving at present on a strict 1.10c, Pittsburgh basis, but in the immediate Chicago district, 1.25c can be done and sales are made without reference to the Pittsburgh price. Manufacturers and jobbers in shafting report that new orders and specifications are coming in more satisfactorily and prices are firmer.

We quote, Chicago delivery, as follows:

Bar iron, 1.12c to 1.18c; hard steel bars, rerolled, 1.15c to 1.20c; soft steel bars and bands and small shapes, 1.25c to 1.30c, base; hoops, 1.48c; smooth finished machinery steel, 1 inch and larger, 1.78c. Shafting 60 per cent off list for carload lots, 57 per cent off for less.

On iron and steel from local stock, we quote, as follows:

Bar iron, 1.55c to 1.65c per pound base; soft steel bars, 1.55c to 1.65c per pound base; soft steel hoops, 1.80c to 1.90c, full extras.

Structural Material. — Fabricating contracts for buildings show some improvement, although no great activity in this line is expected during the winter. Approximately 8,500 tons of plain material will be required for contracts placed in the west last week. This includes the Hub building, Chicago, 6,000 tons, on which the Vierling Steel Works is low bidder, and also 1,383 tons each the Minnesota Steel Co. placed with the American Bridge Co. for its rail mill building at the Duluth plant. The Chicago, Indianapolis & Louisville Railway Co. has ordered one 159-foot and one 157-foot span for the Wabash river crossing at Lafayette, Ind., 165 tons, from the Wisconsin Bridge & Iron Co. The Minneapolis Steel & Machinery Co. will fabricate a high-school building at Minneapolis, 363 tons, and th Decatur Bridge Co. has taken an order for 154 tons for a new building at th University of Illinois. E. S. Hall, Chicago, has let a contract for a factory building which will require 409 tons of plain material.

We quote, structural material, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.30c to 1.35c. For extras, see Pittsburgh report.

Plain material out of store is as follows:

All angles, 3 inches and larger, including 6 inches, $1.65 to $1.75 per 100 pounds; angles over 6 inches, $1.75 to $1.80 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.65 per 100 pounds, base; channels, 3 inches and larger, $1.65 per 100 pounds, base.

Rails and Track Supplies.—The lack of rail orders continues to be one of the least encouraging features of the western market and but very little tonnage has been placed up to the present time by the western trunk lines for their 1912 requirements. The rail mill at South Works will close about Dec. 20 for annual repairs, but it is not expected that it will be idle any longer than usual. Orders for spikes and bolts have been somewhat better recently and some tonnage in angle bars has been taken. Prices of track fastenings show the strain of competition and bolts are now quoted 1.90c and spikes 1.50c, Chicago.

We quote, light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.50c to 1.55c, smaller size spikes, 1.65c, base; track bolts with square nuts, 1.90c base.

Plates.—Plate mills in this district

are daily becoming more congested and were it not for outside competition by some manufacturers who are not so well supplied with orders, prices would increase sharply. As it is, 1.30c, Chicago, represents minimum quotations and for contracts running three months, makers are asking $1 a ton additional. Some mills will not quote beyond the first quarter, while others are asking an advance of $2 over current quotations for shipment over the entire first half. The Missouri Pacific has ordered 1,000 gondola cars, 500 box cars, 500 automobile cars and 500 furniture cars from the American Car & Foundry Co., and 500 box cars from the Standard Steel Car Co. The Chicago & Northwestern, in addition to the 2,500 cars reported last week, has ordered 600 automobile cars from the Western Steel Car & Foundry Co. and 500 flat cars from the Standard Steel Car Co., and is now in the market for 500 refrigerator cars. The Western Live Stock Express Co., Chicago, is inquiring for 150 refrigerator cars. The California Plumas, Quincy, Cal., is in the market for 30 flat cars, 10 box cars, one coach and one combination car. The Soo Line has ordered 750 box cars from the American Car & Foundry Co. and the Live Poultry Transportation Co., Chicago, has ordered 150 poultry cars from the same maker. The Algoma Central & Hudson Bay Co. bought 42 cars recently and the Kansas City Southern has placed orders for 16 passenger cars.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.30c to 1.35c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.65c.

Sheets.—Tonnage is coming to the mills a little more freely. Prices are a trifle firmer and some of the extremely low quotations which have prevailed are disappearing. There is more tonnage being offered for forward delivery and specifications against contracts for shipment this month are fair. The present indications are that prices on sheets will be advanced within the next month.

We quote, store prices, f. o. b., Chicago, as follows:

Blue annealed, No. 10, 1.95c; No. 12, 2.05c. Box annealed, No. 28, 2.40c. Galvanized, No. 28, 3.35c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Merchant Pipe and Tubes.—Buying of merchant pipe has been moderately good lately in spite of somewhat unsettled price conditions. The market for boiler tubes shows slightly more activity than a month ago, and while there has been some irregularity in prices, this seems to be gradually disappearing.

We quote, merchant pipe and tubes, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛-¼ inch	70.2	49.2	63.2	41.2
⅜ inch	74.2	63.2	66.2	56.2
2 in. to 3 in.	78.2	70.2	72.2	64.2
4½-6 inches	75.2	66.2	69.2	60.2
7-12 inches	72.2	61.2	67.2	56.2
Extra Strong Plain Ends.				
¼ inch	71.2	64.2	54.2	52.2
2-3 inches	76.2	69.2	61.2	55.2
7-8 inches	66.2	55.2	59.2	47.2
Double Extra Strong.				
¼ inch	59.2	51.2	....	....
2-3 inches	64.2	56.2	....	....
7-8 inches	54.2	42.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	39	..	57½
1¼ to 2¼ inch	55	40	35
2¾ to 3¼ inch	65	50	46
3½ to 4½ inch	67½	50	46
5 to 6 inch	55	..	..

Cast Iron Pipe.—Routine orders are fair and no heavy tonnages have been booked in the west recently. A large number of municipalities in the middle west are commencing to think about their spring water works improvements and business early in the year is expected to be good.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $26.50; 6 to 12 inches, $24.50, larger sizes, $24; gas pipe, $1 a ton higher.

Old Material.—The scrap market is undoubtedly in a firmer condition and most sellers seem to be in a position to hold out for the time being for higher prices. The principal advances are in old car wheels and rerolling rails, which have been bid up about 75c a ton. No. 1 cast is also somewhat scarce and higher. Consumers view the advancing prices with increasing diffidence and are curtailing their purchases to the absolute minimum, unless they are offered bargains. Until finished materials show more substantial improvement, there cannot be much basis in this market for sustained higher scrap prices.

We quote, for delivery in consumers' yards, Chicago, as follows:

GROSS TONS.

Old car wheels	$12.50 to 13.00
Old iron rails	14.50 to 15.00
Rerolling rails (5 ft. and over)	12.75 to 13.25
Old steel rails (3 ft. and under)	10.75 to 11.25
Frogs, switches and guards	10.00 to 10.50
Heavy melting steel	9.75 to 10.25
Shoveling steel	9.25 to 9.75

NET TONS.

No. 1 R. R. wrought	$10.25 to 10.75
No. 2 R. R. wrought	9.25 to 9.75
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	10.00 to 10.50
Shafting	13.00 to 13.50
Iron car axles	17.00 to 17.50
Steel car axles	15.50 to 16.00
Locomotive tires	14.00 to 15.00
Dealers' forge	8.75 to 9.25
Pipe and flues	7.00 to 7.50
No. 1 cast	10.25 to 10.75
No. 1 busheling	8.00 to 8.50
No. 2 busheling	5.75 to 6.25
No. 1 boiler cut	7.00 to 7.50
Boiler punchings	12.50 to 13.00
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	5.75 to 6.25
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.25 to 9.75
Angle bars, splices, etc., iron	12.00 to 12.50
Angle bars, steel	8.60 to 9.10
Stove plate and light cast scrap	9.25 to 9.75

Will Train Natives.—A curious development credited to an English syndicate of ironmasters is the building near Cape Town, South Africa, of rolling mills and two ball furnaces for the making of iron in South Africa, says our Birmingham, Eng., staff correspondent. Head rollers and other hands are going out from England or Scotland under a two-year agreement to train native labor.

Stove Makers Buy Pig Iron—Advance in Wire Prices.

Office of THE IRON TRADE REVIEW, Penton Bldg., Dec. 12.

Iron Ore.—It is rather early to begin looking forward to shipments for next year, but indications at present are that the leading shippers will make preparations for a considerably heavier movement next year than that of the season just closed. It is not expected that any action concerning prices will be taken until sometime next spring.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—Stove companies of Detroit have been very heavy buyers of pig iron during the past few days, the total tonnage covered for next year's delivery being 10,000. Cleveland agencies have enjoyed a very satisfactory business, comparatively little of which was placed in the immediate Cleveland district. Prices in Cleveland are, however, somewhat firmer. For delivery in this city, $13.25, delivered, is now apparently the minimum price. For delivery to outside points, the furnace quotations vary according to the freight rate and competition. We note a sale of 800 tons of foundry for delivery into the first half of next year at $13.25, deliv-

ered, city. Malleable is firmer at $13, valley. We quote, delivered in Cleveland for the remainder of the year and the first half of next year, as follows:

No. 1 foundry	$13.75
No. 2 foundry	13.25
No. 2 southern	14.35
Gray forge	12.50
Bessemer	15.15
Lake Superior charcoal	16.50
Jackson Co. 8 per cent silvery	17.05

Coke.—The coke market is quiet, but prices are firm and unchanged. We quote:

Connellsville furnace coke, $1.50 to $1.55 for prompt delivery, and $1.60 to $1.75 on contract; Connellsville foundry coke, $1.90 to $2 for prompt, and $2.15 to $2.40 on contract.

Finished Material.—Business as to both new orders and specifications is for the most part satisfactory, although the volume of new orders does not involve any noteworthy tonnages. Following the meeting of representatives of the order department of the American Steel & Wire Co., the price of wire products was advanced $1 a ton. It is not expected that a great deal of business will be placed at the new figure, which, however, it is believed, will have a steadying effect. Mills are still making a strenuous effort to maintain 1.10c, Pittsburgh, on bars, and 1.15c, Pittsburgh, on shapes and plates as minimum quotations, and are generally successful. Lower quotations, especially on bars and plates, occasonally heard of, are generally ascribed to old business pending when the recent advance of $1 a ton was made. On some business, 1.15c, Pittsburgh, has been done on bars and 1.20c on plates and shapes. Some mills are willing to contract for plates at 1.15c to April 1 and 1.20c after that, but there is no contracting at the higher figure. Bids on the new city hall will be received tomorrow. Galvanized sheets seem to be somewhat improved, but low quotations have not disappeared.

Old Material.—The success which attended the efforts of some large local consumers of heavy melting steel to cover in outside markets, quotations having been advanced by local sellers to the point where buying in some of the other lower priced markets would be profitable, has led to a recession in the price to $11 to $11.50. Rolling mills are buying very conservatively the past week and are not running with any regularity. We quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$14.00 to 14.50
Old steel rails (under 6 ft.)	12.00 to 12.25
Old steel rails (over 6 ft.)	12.25 to 12.75
Relaying rails	20.00 to 21.00
Old car wheels	12.00 to 12.50
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	11.50 to 12.00
Steel axles	18.00 to 18.50
Axle turnings	8.50 to 9.50
Malleable iron (agricultural)	10.75 to 11.25
Heavy steel	11.00 to 11.50
Country mixed steel	9.50 to 10.00
Bundled sheet scrap	8.50 to 9.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.00 to 11.50
No. 1 busheling	9.50 to 10.00
No. 1 machine cast	11.00 to 11.50
No. 1 dealers' wrought	10.00 to 10.50
Machine shop turnings	7.00 to 7.25
Pipes and flues	9.00 to 9.50
Wrought drillings	7.00 to 7.25
Stove plate	9.00 to 9.50
Cast borings	6.50 to 7.00
Wrought iron piling plate	15.50 to 16.00
Wrought iron arch bars	**15.50 to 16.00**

Increase in Inquiry and Sales of Pig Iron.—Prices Firmer.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., Dec. 11.

Pig Iron.—The general condition of the market shows considerable improvement, so far as tonnage sold is concerned. A number of southern furnaces that were said to be actively out for business appear to be well sold up for several months to come, and consequently are not much interested at this time in low price iron. Northern furnaces seem well satisfied and not interested in anything below $13 Ironton. It is reported that one of the large southern producers is quoting on a $10.25 basis for second quarter business, with first and prompt iron holding at $10. Selling agencies report gradual increase in inquiries and sales, especially from the smaller melters, the aggregation representing the largest buying movement for several months past. Local territory apparently has been the last to respond to this movement, reports indicating eastern and western activity some weeks since. Local foundries are fairly busy at this time, and several of them have covered for part of next year's requirements. Machine tool demand is somewhat stronger and foundries catering to this industry report satisfactory business. A melter in Indiana is inquiring for 1,000 tons of No. 2 northern and 1,000 tons No. 2 southern for first half delivery. A Michigan concern wants 1,000 tons southern No. 2, for the same delivery. A Wisconsin manufacturer is inquiring for 2,000 tons of 3 per cent silicon for first half and an Iowa melter wants 500 tons of southern No. 2 for first half. In addition to these inquiries, are a number of local, some larger and some smaller, aggregating quite a fair tonnage. A Wisconsin melter secured 2,000 tons of southern No. 1 soft for first half on a $10.50 Birmingham basis. A concern in Indiana bought 500 tons of 6 per cent silicon for first half delivery on a $14 basis. Smaller sales both for local and contiguous territory have been numerous and amount to considerable in the aggregate. With freight rates from Birmingham $3.25 and from Ironton $1.20, we quote at Cincinnati as follows:

Southern foundry No. 2	$13.25
Southern foundry No. 3	13.00
Southern foundry No. 4	12.75
Southern gray forge	12.50
Mottled	12.50
Southern No. 1 soft	15.20
Southern No. 2 soft	14.70
Standard southern car wheel	25.50
Northern No. 2 foundry	14.20
Northern No. 3 foundry	13.70
Northern No. 4 foundry	13.20
Jackson county 8 per cent silicon	16.95

Coke.—It is reported that a block of practically 7,000 tons of furnace coke was sold this week for forward delivery. There appears to be a little firming up in the Connellsville district prices, but not sufficient to necessitate a change. Foundry trade is quiet, the only feature of interest being the demand for prompt shipments on contract. We quote from the leading coke producing districts as follows:

Connellsville district:	Prompt shipment.	Contract second half
Foundry coke	$2.00 to 2.25	$2.00 to 2.40
Furnace coke	1.55 to 1.65	1.75 to 1.90
Wise county district:		
Foundry coke	2.00 to 2.25	2.00 to 2.25
Furnace coke	1.75 to 2.00	*Sliding scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.10	2.00 to 2.10
Furnace coke	1.50 to 1.75	1.60 to 1.75
New river:		
Foundry coke	2.50 to 3.15	2.60 to 3.25
Furnace coke	2.10 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16⅔ per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—The local market is quiet and little in a structural line is pending of particular interest. New specifications for steel are said to be fairly satisfactory as reported by certain interests, others stating that trade is quiet and dull. Steel bars are well maintained on a 1.10c Pittsburgh basis, with quotations on less desirable business 1.15c.

Old Material.—There are evidences that trade has improved to some extent during the past ten days, although sales have been far below normal tonnage. Shipments on contract have brightened very perceptibly and the whole aspect is better than for some time. There appears to be no change in prices, and they continue to show more or less fluctua-

tion. According to dealers they are as follows:

GROSS TONS.

Old iron rails	$12.00 to 13.00
Old steel rerolling	11.00 to 11.50
Old iron axles	18.00 to 18.50
Steel melting scrap	9.50 to 10.50
Car wheels	10.50 to 11.00

NET TONS.

Old No. 1 R. R. wrought	$10.50 to 11.50
No. 1 machinery	10.00 to 10.50
No. 1 busheling	8.00 to 9.00
Stove plate	6.50 to 7.00
Machine shop turnings	5.50 to 6.00
Cast borings	4.50 to 5.00
Grate bars	6.00 to 7.00
Sheet iron bundled	6.50 to 7.50
No. 1 cast scrap	10.00 to 10.50
Heavy turnings	6.00 to 7.00

PHILADELPHIA

Improvement in East Coming Slowly —Scrap Prices Advance.

Dec. 11.

The feeling in the eastern iron and steel market runs more strongly to the cheerful side, especially in finished lines, but the actual improvement in basic conditions is moderate. In pig iron, though the new tonnage is being well maintained in volume, the sentiment is not optimistic because of the low prices. The gain in new bookings by eastern steel mills is small. Prices, nevertheless, show a hardening tendency. The features of the week in this market have been the general advance of $1 posted by wire producers and the rising swing in scrap prices, which are 25 to 50 cents higher.

Pig Iron.—The larger inquiries for iron in this territory have been disposed of, but there still remains an active buying of smaller lots. The aggregate of such purchases is less than the volume of trade recently done, yet the substantial interest of consumers in forward needs continues apparent. The merchant interests affiliated with the Eastern Pig Iron Association reported at the meeting held in this city the past week the heaviest tonnage by far of new business booked in November of any month of the year and equal to the combined bookings of several previous months. Stocks showed little change. Those in foundry iron were less, but this shrinkage was offset by the increase in basic. The Virginia Pig Iron Association, which also met this week, reported a slight increase in stocks. The price situation is mixed, for the blowing in of several furnaces has intensified competition, especially upon the larger tonnages. In basic, $14.25, delivered, has been shaded by at least one seller and some exceedingly low prices are reported in connection with some large foundry orders placed in this city on which the specifications were somewhat irregular. On the other hand, one or two makers are inclined to ask advances. It develops that the recent purchase of foundry iron by the Baldwin Locomotive Works was heavier than first reported and will reach from 10,000 to 12,000 tons, which was distributed among several producers. The Pennsylvania railroad has closed for about 6,000 tons of coke and charcoal iron for first quarter for Altoona. The coke iron went largely to central Pennsylvania furnaces. A Schuylkill valley consumer took 1,500 tons of foundry grades. Prices on No. 2X at Philadelphia and vicinity cover the wide range of $14.75 to $15.25, delivered. Delaware river pipe makers have not bought any additional large lots, but several of them would take round tonnages at their offers which on northern iron are usually under $14, delivered. A Lynchburg, Va., pipe foundry bought 4,500 tons of Nos. 3, 4 and forge for first quarter, and another pipe maker in the same district is credited with purchases of about 3,000 tons. Small sales of standard mill forge at $14.50 are noted. A Cumberland, Md., steel maker bought about 1,000 tons of prompt basic from middle western furnaces at slightly below $14.25, delivered. Virginia makers quoted $12.50, furnace, on this business. Eastern Pennsylvania basic consumers continue indifferent. The principal recent buying has been in central Pennsylvania territory, as reported, and at exceedingly low prices. Generally eastern makers will not go below $14.25, delivered, and one small sale on the equivalent of $14.50, delivered, was made. On low phosphorus, the basis of $19, Philadelphia, could probably be done on a round lot. Some malleable continues uncovered with buyers seeking prices of about $15.60, delivered. The Carbon furnace will soon go in and the Temple stack is slated to resume after Jan. 1. Punxsutawney went in this week. The West End furnace in Virginia has been ordered in.

We quote for prompt and first quarter shipment as follows:

No. 1X foundry	$15.25 to 15.50
No. 2X foundry	14.75 to 15.25
No. 2 plain	14.50 to 14.75
Standard gray forge	14.25 to 14.50
Basic	14.25 to 14.50
No. 2X Virginia	15.05 to 15.30
No. 2 southern	14.00 to 15.00
Standard low phosphorus	19.00 to 19.50

Finished Material.—A survey of eastern conditions continues to show only a very moderate improvement in finished material. Enough business is coming out to sustain the operations of eastern mills on about an even basis, or on the average of 50 to 60 per cent of capacity. Steelton is more active and there is a slight gain this week at the Coatesville plants. The Sparrows Point rail mill is still idle. Some leading makers report they have only a slightly heavier unfilled tonnage at present than a year ago.

Prices continue to make a show of hardening. Plate and shape quotations are settling more uniformly around 1.20c, Pittsburgh, or 1.35c, Philadelphia, on the regular run of business, though lower prices have not disappeared. Steel bars seem firm at 1.10c, Pittsburgh. Wire products have been advanced $1 a ton, effective at once, making the new quotations $1.55, Pittsburgh, on nails, and $1.35 on plain wire. Sheets are firmer. Occasional concessions on billets are being made by producers without the Philadelphia district. Consumers continue to freely tender contracts at today's prices, but the mills are holding such deliveries to several months ahead.

The Bethlehem Steel Co. will furnish 1,600 tons and the Eastern Steel Co. 400 tons of plain material for the Spreckles sugar warehouse, this city. It develops that the American Bridge Co. has 1,200 tons for the American Trust & Savings bank, at Birmingham, Ala., which was awarded some time ago. Action on the Lapham apartment, this city, 800 tons, is imminent. The Baldwin Locomotive Works extension, 4,500 tons, will probably be disposed of when the directors meet, Dec. 14. Revised steel plans for the Royster building, Norfolk, will soon be out with reduced requirements. Other pending tonnage includes 2,000 for the stock exchange, this city, and about 1,000 tons of shapes for boat work under consideration. An inquiry for 500 cars for the Philadelphia traction system is out.

We quote, delivered in Philadelphia and vicinity, as follows:

Structural shapes, 1.30c to 1.35c; steel plates, 1.30c to 1.35c; steel bars, 1.20c to 1.25c; common bar iron, 1.20c to 1.25c; cut nails, 1.65c to 1.70c; blue annealed sheets, No. 10 gage, 1.55c to 1.60c; 4 x 4-inch open-hearth rolling billets, $21.40 to $22.40; forging billets, $26.40 to $27.40. Extras shown under Pittsburg report.

Old Material.—A more buoyant tone has overspread the market resulting from more active bidding for material, much of which is from the brokers and from a moderate increase in consumptive buying. Prices are ruling higher by from 25 to 50 cents, and it is generally believed the monthly railroad lists closing the week will bring fully 50 cents higher than in November. This would be on the basis of about $12.50 for heavy steel.

While consumers have not made any large known purchases, inquiries out for steel, chiefly from middlemen, exceed 10,000 tons. There are also many small inquiries for cast scrap, aggregating several thousand tons, the principal one of which is for a nominal lot of 300 tons for a locomotive builder, which will probably result in a purchase of several thousand tons. Numerous small sales of heavy cast have been made at the spread of $12.50 to $13, delivered. Other sales include 500 tons of car wheels to a steel company at $13.50, delivered, and of No. 1 railroad wrought at $14.65 and $14.80, delivered. Two iron mills in the district have been the principal wrought buyers.

We quote, gross tons, delivered in eastern Pennsylvania and New Jersey consuming territory, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails (rerolling)	13.50 to 14.00
No. 1 heavy melting steel	12.00 to 12.50
Old car wheels	12.00 to 12.50
Old iron car axles	21.00 to 22.00
Old steel car axles	17.00 to 17.50
No. 1 R. R. wrought	14.50 to 15.00
Wrought pipe	11.50 to 12.00
Cast borings	8.00 to 8.25
Wrought turnings	9.00 to 9.50
Heavy cast scrap	12.75 to 13.25
Railroad malleable	11.25 to 11.75
Stove plate	10.00 to 10.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

NEW YORK

Slow Movement Upward of Prices—Pig Iron Not so Active.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Dec. 12.

Iron Ore.—Shipments of Wabana, Newfoundland, ore to the United States during the year of 1911 will reach about 185,000 tons. The two final cargoes of the season's movement are now on their way to this country. The year's shipments are about 30,000 tons less than in 1910 and somewhat below the tonnage sold for the season, as postponements of shipments were made at the request of several furnaces. The leading Cuban shipper will bring in this year approximately 600,000 tons from its workings. Eastern furnaces are still slow to take up the consideration of their forward or next year's ore requirements.

Pig Iron.—Larger sales are not so numerous and the tonnage moving in the market seems less than it was a week or so ago. At the same time, there has been no marked moderation in the activity at which buyers are covering upon their first quarter and first half requirements. The result of the recent heavy buying movement on prices is reflected in several directions. Sellers, having loaded their books with business for several months ahead at low prices, are posting advances. In Buffalo, some of the leading sellers have raised their schedules 50 cents for second quarter to $13.50, furnace. One of the Lehigh Valley interests is now asking $14.50, furnace, for No. 2X on regular business, but $14.00, furnace, is freely available and this price has been shaded by makers in accumulating tonnage for blowing in. There is still evidence, however, of some very low price levels. Connecticut buyers at water points are understood to have bought both high and low grade iron around $15.00, delivered, but these prices have been made possible by water movement and are exceptional. The range of the New England market is about $15.25 to $15.45, for No. 2X. A New Jersey buyer of tidewater bought 900 tons of high silicon for first quarter from a Lehigh Valley maker at about $14.60, delivered, and 900 tons of low grade from eastern Pennsylvania at about $14.50, delivered. The usual quotation on Lehigh Valley No. 2X is $14.70, or $14.00, furnace. The leading pump interest this week bought about 1,000 tons for easteru plants and is still in the market for 2,000 tons of high and low silicon iron for East Cambridge, Mass., and Elmwood Place, O. A New Jersey stove maker took 1,000 tons of No. 2X at $14.75, delivered, for first half; a structural shop 1,000 tons of No. 2X for first quarter at $14.70, delivered, and a Connecticut foundry 1,000 tons of No. 2X for second quarter at $15.45, delivered, or $13.00, Buffalo, this business being done before the advance in price. Another New Jersey shop took 750 tons at full price. A Connecticut valve maker has bought partially against its inquiry for 1,000 to 2,000 tons. A sale of 2,000 tons of mill forge in the Buffalo district is reported. An eastern pipe maker participated quite heavily in the recent movement of southern iron, buying 10,000 tons or more for its Baltimore and southern plants. Another large order for pipe iron has been under negotiation in the east, but no action is reported. Virginia No. 2X is quotable at $12.25, furnace, for second quarter. The recent buying movement has caused the blowing in of several Pennsylvania furnaces and some increase in the active capacity in the Buffalo district will shortly be made. We quote, gross tons, for prompt and first quarter shipment in New York tidewater, as follows:

Northern foundry No. 1	$15.00 to 15.25
No. 2X foundry	14.75 to 15.00
No. 2 plain	**14.50 to 14.75**
No. 2 Virginia	**15.05 to 15.30**
No. 2 southern foundry	14.50 to 15.00
Malleable	**15.00 to 15.25**
Gray forge	**14.25 to 14.50**

Ferro-Alloys.—Sales of ferro-manganese have been heavier during the past week and from 3,000 to 4,000 tons has been quietly closed. While leading English makers are quoting firmly on the basis of $38.50, Baltimore, for forward shipment, some concessions have been made by sellers on this side. A sale of 500 tons for first half at $38.50, seaboard, is noted. A Chicago buyer is also reported to have taken 500 tons for forward shipment at $38.00, seaboard. A larger lot in the middle west was put out and closed in the week. Reports from abroad are that German makers are now thoroughly co-operating with the English makers. The 6,000 tons of 50 per cent ferro-silicon for next year's shipment to the Steel Corporation plants is still pending. A western Pennsylvania steel maker is also inquiring for this material. Because of the largely advanced price of 50 per cent, Bessemer ferro-silicon seems likely to enjoy a heavier demand. Ten and 11 per cent are quotable at $24.00 to $24.50, delivered, in the east. We quote 80 per cent ferro-manganese at from $38.00 to $38.50, Baltimore, and 50 per cent ferro-silicon at from $68.00 to $70.00, Pittsburgh.

Cast Iron Pipe.—A heavy tonnage from water and gas companies continues before the foundries, but final awards are still deferred. Eastern pipe makers have received definite advices of the large purchase contemplated by the city of Quebec, which will call for 18,000 tons, largely of 40-inch, with some 44-inch included. Bids are to close Dec. 20. Water and gas companies at Bridgeport, Conn., have placed 800 tons with an eastern Pennsylvania foundry. Lowell, Mass., is out for 400 tons. It is reported that a portion of the recent large order placed by the Consolidated Gas Co. will be filled by the Standard Cast Iron Pipe & Foundry Co. Reports of low prices are still to be heard. We quote 6-inch pipe at from $22.00 to $23.00, delivered f. o. b. New York, in carload lots.

Finished Material.—The trend of conditions is apparently in the direction of firmer and higher prices, though the movement is by no means a rapid one. The advance of $1.00 a ton in wire products this week after a long period of decline is illustrative of the temper of producers not to follow the present depressed levels any longer than they can avoid. The mills have set 1.20c, Pittsburgh, on shapes and plates as the objective level next to be reached, and several of them are quoting more firmly on this basis, but consumers are still able to freely buy at a less figure. Steel bars are holding evenly at a minimum

of 1.10c, Pittsburgh, and there are reports that the passing of the price is imminent. New business being entered in the New York market is not noticeably heavier.

Structural awards are fair but considerable time is elapsing between the offering of a contract and its closing, indicating that buyers are shopping energetically for bargains. New offerings are not heavy. The American Bridge Co. has taken 1,700 tons from the city for a traction railroad bridge at the St. George, Staten Island, terminal and 1,500 tons for the Guarantee Trust building, this city. The Monohan Express building, this city, 1,500 tons, has gone to Milliken Bros., Inc., who have also taken 1,000 tons for the Portland hotel, Portland, Ore., and 750 tons for the Paterno apartment at 115th street and Broadway. Other awards include Murdock building, New Haven, Conn., 1,000 tons, to the Berlin Construction Co.; Carnegie Construction Co. apartment, 119th street and Amsterdam avenue, 700 tons, to Ravitch Bros. Wells Bros. have the general contract for an apartment at Fifty-fourth street and Park avenue, 700 tons, and the Geo. A. Fuller Co., 1,200 tons, for the Cooper Union school, this city. The Eastern Steel Co. has 3,000 tons additional of plain material for car work for the American Car & Foundry Co., for shipment to Berwick, Pa. Plans are out for bids Dec. 18, on the Auerbach candy factory. Eleventh avenue and Forty-sixth street, this city, 3,000 tons and on 500 tons for the United States marine hospital, Staten Island. An addition for the Detroit Edison Co., Detroit, Mich., 1,000 tons, is out. The Allen house, Hartford, Conn., 1,500 tons, is undecided. Other pending lots include Graphic Arts printing building, this city, 2,200 tons; Hoosac Falls, North Adams, Mass., 1,300 tons; Gilchrist building, Boston, 1,100 tons; Eagle loft, this city, 3,000 to 4,000 tons; Madison Square Garden, this city, 22,000 tons. Patrick McGovern, Boston, has received the award of the contract for the construction of section 9, of the Lexington avenue subway. The steel requirements, which are unplaced, will probably be considerably more than the original estimate, 2,500 tons. A contract for building three bulk freight barges is before eastern shipbuilders. The Harriman lines are reported to have placed 62 steel coaches with the Pullman Co.

We quote, delivered at New York, tidewater, as follows:

Plain structural shapes, 1.31c to 1.36c; tank plates, 1.31c to 1.36c; steel bars, 1.26c to 1.31c; common iron bars, 1.25c; plates and shapes from store, 1.70c to 1.80c. Extras shown under Pittsburgh report.

Rails and Track Material. — The outlook in the rail market is that some important awards will shortly be announced. Action on the Pennsylvania and New York Central requirements is near at hand. Preliminary estimates of tonnage differ, but the aggregate will be 300,000 tons and probably more. A meeting of the directors of the New York Central, being held today, it is understood will have important bearing upon the rail purchase of this system. The Northern Pacific is about to close on 40,000 tons, part of which is expected to go to the Colorado mill. The Delaware, Lackawanna & Western order will probably be placed soon. The Delaware & Hudson has put out a formal inquiry for 12,000 tons of open hearth rails, but this business has virtually gone to the Bethlehem Steel Co., as previously reported. Stone & Webster are inquiring for 7,000 tons of girder rails. The Lehigh Valley railroad recently placed 700 tons of light rails with the Pennsylvania Steel Co.

Old Material.—More stir is to be noted in the scrap market, but this seems to be coming largely from the brokers, who are making the offers, rather than from the consumers. There have been no tonnage sales made to the mills either in steel or other grades, but the volume of trading is larger and prices are inclined to rise. Steel works operations in the east are not increasing. Some small sales of steel at $12.25, delivered, are noted. Cast scrap has sold in recent cases in the district at $11.50, delivered. We quote, gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$10.00 to 10.25
Old iron axles	18.25 to 18.75
Old steel shafting	13.75 to 14.25
No. 1 heavy melting steel	9.75 to 10.25
No. 1 R. R. wrought	12.00 to 12.50
Iron track scrap	11.25 to 11.75
Wrought pipe	9.25 to 9.50
Cast borings	6.00 to 6.50
Cast borings	5.75 to 6.25
Machine shop turnings	6.00 to 6.50
Railroad malleable	9.25 to 9.75
Stove plate	8.25 to 8.50
Grate bars	6.50 to 6.75

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York.

The New Haven Boiler Works, New Haven, Conn., advises that its proposed new building will be 48 x 136 feet, and that all of the equipment has been contracted for.

BUFFALO

Heavy Sales of Pig Iron and Prices Are Firmer.

Buffalo, Dec. 12.

Pig Iron. — The tonnage for the week was heavier than it has been in any similar period for the past month or six weeks. The total tonnage booked by the local furnaces will amount between 25,000 and 30,000 tons. One of the interests disposed of over 10,000 tons. The sales were principally in foundry and malleable, also some basic and gray forge. Contracts were mostly for January, February and March delivery, and some for the first half of 1912.

Several of the furnaces have booked tonnage to the extent that it practically takes care of their capacity during the next few months to come, with the consequent following of a strict firming up in price schedules. The tone of the local market is stronger than it has been for some time back. Inquiry has been heavy and the purchase of considerable tonnage is still being considered. In line with information recently given, stocks on the yards of the Buffalo furnaces still continue to decline.

No. 1X foundry	$13.50 to 13.75
No. 2X foundry	13.25 to 13.50
No. 2 plain	13.00 to 13.50
No. 3 foundry	13.00 to 13.25
Gray forge	13.00 to 13.25
Malleable	13.25 to 13.50
Basic	13.50 to 14.00
Charcoal	16.00 to 17.25

Finished Material.—The general tone of the market is stronger than it was a week ago. The virtual wiping out of the bottom level prices in this district on shapes, bars, plates and structural material by the mills since the first of the month has been emphasized by a disinclination on the part of the producers to cut the advanced quotations. Advice has been received from New York that another $1 per ton may be put on some of the leading lines, but this has not been confirmed to date or made effective. The leading interests are holding to an advance over 1911 prices on materials for first quarter delivery in 1912, and an additional increase on second quarter deliveries over those for January, February and March. The open quotations on bars for immediate shipment are 1.10c base, and a 1.15c base for first quarter on contract. Structural is quoted at 1.15c base, for immediate, and 1.20c base, for first quarter on contract. The tendency of the buying and the inquiries

indicate an inclination from many directions to get under cover on immediate and first quarter requirements, and as far into the future, for that matter, as the mills are willing to contract on the present market basis. Wire nails and wire products in this market are quoted at $1.55 base for nails, and $1.35 base for wire.

The Buffalo Structural Steel Co. has been awarded the contract for the material for the new Lawrence hotel, Erie, Pa., which will require about 900 tons. This company also secured the new Tupper-Bryant exchange in Buffalo for the New York Telephone Co., taking about 250 tons.

ST. LOUIS

Decreased Buying of Pig Iron, but Good Inquiry Pending.

Dec. 11.

Pig Iron.—Buying is at a standstill today, but there is a fairly good inquiry in the market, and local sales agents are hopeful that some sales will be made within the week. One concern in the St. Louis territory is inquiring for 2,000 tons of car wheel iron for first quarter delivery, another for 1,000 to 2,000 tons of malleable for first half delivery, and another for 500 tons of Lake Superior charcoal iron for shipment over the first quarter of next year. Quite a number of inquiries also are out for small quantities of iron. Prices seem to have settled down to $10 for southern No. 2, Birmingham basis, and $13 to $13.50 for northern iron, f. o. b. Ironton.

Our tabulated prices for southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$14.25
Southern No. 2	13.75
Southern No. 3	13.25
Southern No. 4	12.75

Old Material.—Some activity is noted in St. Louis in the scrap iron situation, and prices, in some instances, have advanced 50 cents a ton. Our quotations follow:

GROSS TONS.

Old car wheels	$13.00 to 13.50
Old iron rails	14.00 to 14.50
Re-rolling rails (5 feet and over)	12.00 to 12.50
Old steel rails (3 feet and under)	10.75 to 11.25
Light section relayers (45 lb. and under) subject to inspec.	20.00 to 21.00
Re-laying rails, subject to inspec.	23.50 to 24.00
Frogs, switches and guards	10.00 to 10.50
Heavy melting steel	10.50 to 11.00
Shoveling steel	10.00 to 10.50

NET TONS.

No. 1 railroad wrought	$10.50 to 11.00
No. 2 railroad wrought	9.50 to 10.00
Arch bars and transoms	13.00 to 13.50
Knuckles, couplers and springs	9.00 to 9.50
Shafting	13.00 to 13.50
Iron car axles	17.00 to 17.50
Steel car axles	15.00 to 15.50
Locomotive tires	14.00 to 14.50
No. 1 country wrought	8.75 to 9.00
Pipe and flues	7.50 to 8.00
Tank iron and cut boilers	7.00 to 7.25
No. 1 cut busheling	8.50 to 8.75
No. 2 cut busheling	6.00 to 6.25
Cast and mixed borings	5.25 to 5.50
Machine shop turnings	6.25 to 6.50
Railroad malleable	9.50 to 10.00
Agricultural, malleable	8.50 to 9.00
Stove plates	8.75 to 9.25
Angle splice bars (iron)	10.50 to 11.00
Angle splice bars (steel)	9.25 to 9.50

SEATTLE

Improvement in Sentiment, But Orders Mostly for Small Tonnages.

Dec. 4.

Pig Iron.—Quotations on the high grades of imported material show concessions of 50 cents by some dealers, while others hold firm in face of a quiet market. Domestic iron, however, seems to be in as great demand by manufacturers as the imported product. Dealers handling English pig iron report but a slight demand at prices which remain unchanged. Chinese iron is being brought in good sized shipments by the oriental lines and is finding a ready market, but in small lots.

	Prompt.	First Quarter, 1912.
No. 1 Glengarnock	$24.00 to 25.00	25.00
No. 1 Eglinton	23.50 to 24.00	24.00
No. 1 English Jarrow	22.50 to 23.00	23.00
No. 1 Chinese Han Yang	21.50 to 22.00	22.00
No. 1 Cleveland	23.00 to 23.50	23.50
English Doncaster	22.50 to 23.00	23.00

Coke.—Imported cokes continue to be in fair demand, but some of the cheaper grades from local mines are selling in much larger quantities. The lighter ash English cokes hold firm in price, but the inquiry is limited to those manufacturers who have a constant use for that class of fuel.

Old Material.—Scrap iron continues to pour in by incoming sailers which are using it as ballast from Hawaiian and West coast ports, but there is little or no demand. Large junk companies continue to pile scrap at lowering prices for the poorer quality, lower grade miscellaneous scrap selling as low as $4 per ton. Suspension of operation by the Western Steel Corporation plant continues to have its effect upon this portion of the market, only the higher grade of old material being handled at standard prices for eastern shipment.

Iron rails	$14.00 to 15.00
Rerolling steel	14.00 to 14.50
Old axles	19.50 to 20.00
Car wheels	12.25 to 13.00
Smelting, scrap	11.50 to 12.00

Martins Ferry, O., stack of the Wheeling Steel & Iron Co. was blown in Dec. 1.

BIRMINGHAM

Ten Dollar Quotation Holds for Delivery Through First Half.

Birmingham, Ala., Dec. 11.

Pig Iron.—It seems to be well established that practically every producer here is now holding pig iron firm at the $10 schedule, although this delivery can be had on tonnages running through to July 1, 1912. The unusually heavy sales made for the month of November will tend to show an early inroad on the stocks of iron on furnace yards, but it is not believed that any material advance is to be expected at an early date. An effort is being made to induce the railroads south of the Ohio river to lower the rate on pig iron to the extent of $1 per ton, but thus far the carriers have declined to favorably consider such reduction. One seller reports the sale of a round lot of No. 2 iron at $10.25 during the week past. However, the generally accepted figures are approximately as follows, per gross ton, f. o. b. cars furnaces this district:

No. 1 foundry and No. 1 soft	$10.50
No. 2 foundry and No. 2 soft	10.00
No. 3 foundry	9.50
No. 4 foundry and forge	9.25
Basic	10.00

Cast Iron Pipe.—There seems no disposition upon the part of the manufacturers of water pipe to give away any concessions they may have recently obtained in the purchase of pig iron. While new business runs about as it has been running for some weeks still prices are very firm on the following schedule, all per net ton at foundries in the Birmingham district: 4 to 6-inch, $22.50 to $23; 8 to 12-inch, $21.50 to $22, over 12 inches, average $20.50. Gas pipe $1 higher.

METAL MARKETS

St. Louis

Dec. 11.

Lead and Zinc.—Choice lots of zinc blende brought a price of $50 a ton in open market in the Missouri-Kansas-Oklahoma district last week, with 60 per cent qualities selling at from $47 down to $42 a ton, following the decline in spelter, which sold in East St. Louis at $6.35, a drop from $6.85. Choice lots of zinc sold at $55.50 on contract basis, with 60 per cent grades bringing $52.46 a ton. Lead advanced to $64 a ton, following a good demand, an advance of $2 a ton over

the previous week. Calamine remained in good demand at $24 to $26 a ton, with choice lots selling as high as $32.

Chicago

Dec. 12.

New Metals.—Improved demand for galvanized sheets has forced makers to enter the market for spelter in spite of the high prices which have prevailed. Local buying, however, had little effect on the market during the past week. Spelter declined rapidly and is now quoted 6.30c, Chicago. Lead is unchanged and tin declined ½c during the week. A new price list on sheet zinc has been issued, the base being now $8.25, per hundred pounds, f. o. b. La Salle, Ill.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 13½c, casting, 13c, smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.30c lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $8.25 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 45¾c; Cookson's antimony, 9¼c; other grades, 8¼c to 8¾c.

Old Metals.—Prices of old copper and brass are a little better but in general the market remains quiet. Consumers continue to buy only as their current needs demand and stocks in the hands of producers and dealers are comparatively heavy.

We quote, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 12c; copper bottoms, 10c; heavy cut crucible copper, 11½c; heavy red brass, 10c; heavy yellow brass, 8½c; No. 1 red brass borings, 9½c; No. 1 yellow brass borings, 7½c; brass clippings, 8c; lead pipe, 4c; zinc scrap, 4.75c; scrap aluminum, 12c; tea lead, 3¾c; No. 1 pewter, 28c; block tin pipe, 37c; tin foil, 35c; linotype dross, 3¼c; electrotype dross, 3c, stereotype plates, 4½c; stereotype dross, 3¼c; prime slab zinc dross, $88 to $90 a ton.

New York

Dec. 12.

Tin.—The London spot tin market has declned £6 10s since Dec. 5, and the domestic price is off 2¼c per pound from the top of last week's rise. There is no doubt in anyone's mind that the sudden decline is a part of the foreign syndicate's campaign that seems to be shaping for another climax next month, and as far as possible domestic consumers are holding aloof. What business has been done was to meet immediate needs, and due to the usual pre-holiday quietness, they were not large. On the New York metal exchange, today, five tons of April sold at 41.50c, and 25 tons of port of New York, at 42c. It seems evident that consumers are lightly supplied with stocks, they are looking forward to a good demand for manufactured goods next year, and there is every reason to believe that confidence in a staple market would lead to liberal buying for future needs. There is little in present conditions to justify belief that today's values are reasonably close to what tomorrow's quotation will be, however, and they will probably continue to buy only as the metal is needed. Arrivals since Dec. 1 aggregate 1,225 tons, and there are 2,327 tons afloat.

Copper.—The unprecedentedly good statement of the November domestic copper industry has been followed by advancing prices, and a good demand for the metal, considering that December is usually a slack month for wholesale trade. Electrolytic is generally held at 13.50c, cash New York, and 13.62½c, delivered. Lake is quoted on the same basis, but there is good reason for expecting an early advance to the usual premium of ⅛c over the price of electro. Casting is 13.37½c. Exports since Dec. 1 are 12,798 tons. The London standard market closed today at the highest prices reached since January, 1910. Spot at £60 10s and three months at £61 6s 3d.

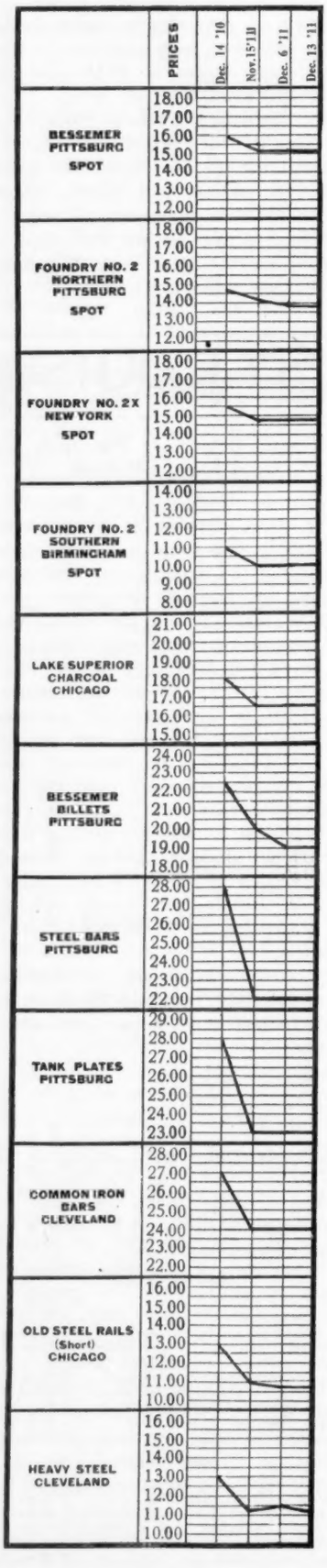
Lead.—The lead market has been quiet and steady at last week's close. Independent sellers are quoting a few points above the leading seller. The latter is offering shipments at 4.45c in New York.

Spelter.—The price of spelter began to decline rapidly early in the week and reached a maximum decline of about 1c per pound before the market was checked. A decided lack of definiteness as to the cause of the sudden change in value has perplexed the small consuming interests and they are waiting for further developments before taking advantage of the break. Prime western can be had at 6.40c in New York in light quantities.

Antimony.—The market is dull and prices softer than last week. Cookson's is 7.75c; Hallett's is 7.70c, and Hungarian is 7c.

The Star Furnace Co., Jackson, O., on Dec. 8 awarded the contract to the Pyro Clay Products Co., Oak Hill, O., for the fire brick to re-line three of its hot blast stoves.

PRICE CHART



WILL MOVE PLANT

Of Western Conduit & Mfg. Co., Recently Reorganized, to Youngstown.

The Western Conduit & Mfg. Co., Chicago, has recently been reorganized, and the capital stock increased from $50,000 to $100,000, with the Youngstown Sheet & Tube Co., Youngstown, O., as a principal stockholder. The plant will be moved to Youngstown as soon as suitable buildings can be erected, which will probably be some time next spring. The company will manufacture its rigid conduit "Harveyduct" and a factory will also be built for the manufacture of "Realflex," the new flexible armored conductor that the company has recently put upon the market. It is probable that the increase already made in the capital stock will not be sufficient to take care of the improvements planned, and in such case, a further increase will be made. The following officers have been elected: President, L. J. Campbell; vice president and general manager, W. J. McKay; secretary and general manager of sales, J. H. Rogers, and treasurer, C. C. Rose.

Low Sheet Prices Withdrawn

Pittsburgh, Dec. 13. (By wire.)—All mills have withdrawn their low prices on sheets and 1.40c on blue annealed No. 10, 1.90c on black No. 28, and 2.90c on galvanized No. 28, f. o. b. Pittsburgh, now represent the market level. Generally speaking, prices during the past 30 days were $1 a ton under these figures and some mills openly quoted $2 under these prices.

Philadelphia Foundrymen's Association

Nominations of officers for the ensuing year were made by the Philadelphia Foundrymen's Association at its regular monthly meeting at the Manufacturers' Club in that city, Wednesday evening, Dec. 6. The present staff of officers was nominated to succeed themselves and the formal election will be held at the next meeting. The present officers are: President, Thomas Devlin, Thomas Devlin Mfg. Co., Philadelphia; vice president, E. E. Brown, E. E. Brown & Co., Philadelphia; treasurer, Josiah Thompson, J. Thompson & Co., Philadelphia; secretary, Howard Evans, J. W. Paxson Co., Philadelphia; executive committee, Walter Wood, R. D. Wood & Co., Philadelphia; Thos. M. Eynon, Eynon-Evans Mfg. Co., Philadelphia; H. L. Haldeman, Pulaski Iron Co., Philadelphia; Walter T. MacDonald, Schaum & Uhlinger Co., Philadelphia; Walter S. Bickley, Penn Steel Castings & Machine Co., Chester, Pa.; trustees, Thomas Devlin, Josiah Thompson, Howard Evans; official chemist, Geo. C. Davis.

The paper of the evening was a discussion of motor trucks suitable for light and heavy hauling for the foundry trade, which was presented by C. R. Hoyme, manager of sales of the Motor Truck Co., Inc., Philadelphia. Mr. Hoyme used various lantern slides to illustrate the durability and advantages of the motor truck in hauling.

LOWER FREIGHT RATES

Not Granted Valley Plants—Will Probably Appeal.

New York, Dec. 13. (By wire.)—Lower freight rates on raw materials to iron and steel manufacturers in the Mahoning and Shenango valleys will not be voluntarily granted by the railroads of that territory, as notification has been given these makers that their request for reductions recently presented had been rejected. The manufacturers have not as yet decided upon their future course in this campaign, but it is more than likely that they will go before the interstate commerce commission. The valley iron and steel makers did not ask for a definite cut, but memorialized the railroads to change from the method of charging all the traffic would stand to one cost of haul plus an equitable profit freight rate. The issue has been made one of the greatest importance by these manufacturers, who assert the reductions are absolutely necessary for their continued welfare.

Motors Contract Let

The Youngstown Sheet & Tube Co., Youngstown, O., has let a contract to the Westinghouse Electric & Mfg. Co., for 99 motors for the cranes, charging machines, transfer tables and blooming mill of the new open-hearth plant.

The International Oxygen Co. announces the change of its address from 68 Nassau street, to 115 Broadway, New York City.

LARGEST INCREASE

Yet Reached Shown by Steel Corporation Tonnage Report.

The unfilled tonnage on the books of the United States Steel Corporation awaiting specification on Nov. 30, 1911, was 4,141,955 tons, which is the highest mark reached since the quarter ending June 30, 1910. This total of unfilled business, announced by the Steel Corporation in its regular monthly report issued Dec. 9, represents a gain of 447,627 tons during the month of November. This increase is the largest for any month reported since the inauguration of the plan of making monthly statements, July 1, 1910.

The large increase in unfilled business reflects the statement previously made that the month of November was the largest of the current year as to new bookings by the Steel Corporation.

Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentage of increase or decline from the previous month, have been as follows:

Date.	Total.	Change, Tonnage.	Change, Per cent.
Nov. 30, 1910....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sept. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,162+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sept. 30, 1910....	3,158,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—
June 30, 1910....	4,257,794	.....	....

St. Louis Sale

St. Louis, Dec. 13. (By wire.) — Five hundred tons of charcoal carwheel iron and 800 tons of southern iron were sold yesterday, to a Quincy, Ill., buyer.

Briquetting Plant. — The Cambria Steel Co., Johnstown, Pa., has about completed the installation of an experimental plant in which it will apply the Schumacher & Ronay briquetting processes, which are in such successful operation in Germany, Belgium and Russia, in which countries over a million tons of flue dust and ores are now annually briquetted. The General Briquetting Co., 25 Broad street, New York City, is the owner of the American rights.

PLAN WILL PREVAIL

And British Buyers are Reconciled to It Apparently.

Birmingham, Eng., Dec. 2.

The rebate scheme continues to be discussed, but it is increasingly evident that the makers of structural material will have their way. A sort of half-hearted protest is being made by the merchants, but these objectors have already intimated that they will withdraw their opposition, if certain distasteful features, and especially the proviso by which they have to disclose the names of their customers, are eliminated, or modified. At the same time, consumers are showing their hostility to the rebate arrangements by placing orders, wherever they can, with the few firms outside the scheme.

It is remarkable that the most confirmed free-traders are found among the supporters of the rebate scheme. The most notable deliverance is that by Lord Furness, who, presiding at the Cargo Fleet Iron Co. meeting, referring to the rebate system said he drew a distinct line between protection as practiced by a trade or an individual. They were not content to see bread-and-butter orders lifted by foreign traders. The proposal left no man less free to deal with the markets of the world than before.

Will Roll Large Plates For Boilers

Worth Bros. Co., Coatesville, Pa., will roll four unusually large boiler plates for the American Ship Building Co., Cleveland. They will be 275½ inches long and will weigh 13,500 pounds.

Base Price Reduced

The base price of sheet zinc, for casks of 600 pounds, has been reduced by a leading manufacturer from $8.50 to $8.25 per 100 pounds, f. o. b. La Salle, Ill., effective Dec. 9. This applies to gage Nos. 9 to 19, inclusive. For other thicknesses, the usual extras are added.

Steel Barge Launched.—The Jones & Laughlin Steel Co. on Dec. 12, launched an all-steel coal barge 200 feet long, with a carrying capacity of 1,100 tons. This is the second all-steel barge turned out of the company's Keystone works. Heretofore it has not generally been known that the company is a builder of coal barges. The all-steel barge launched today will be used for the transportation of coal from the company's mines at California, Pa., down the Monongahela river to the company's plants.

PLANS CHANGED

For the Proposed Consolidation of Two Southern Iron Companies.

Modified plans have been arranged for the proposed consolidation of the Alabama Consolidated Coal & Iron Co., and the Southern Iron & Steel Co., under which the preferred stockholders of the Alabama company will receive 30 per cent of par value of their securities in the new common stock in addition to 150 per cent in the new preferred stock. Depositing common stockholders of the Alabama Consolidated will receive 100 per cent in the new common stock, instead of 115 per cent, in addition to the original allotment of 122 per cent in the new preferred issue. The common shareholders, upon payment in cash of 50 per cent, instead of 80 per cent of the par value of their stock, will be entitled to subscribe pro rata for $1,250,000 instead of $2,000,000 of the new bonds, $312,500 instead of $500,000 of the new preferred stock, and $1,250,000 instead of $2,000,000 of the new common stock

Depositing preferred stockholders of the Alabama Consolidated, upon payment of 60 per cent cash of the par value of their shares, will be entitled to subscribe pro rata for $750,000 of the new bonds, $187,500 new preferred stock and $750,000 of new common stock.

Carnegie Banquets "Old Boys"

The tenth annual dinner of the Carnegie Veterans' Association, which is composed of those who were associated with the old Carnegie Steel Co., was held at Andrew Carnegie's Fifth avenue home in New York, on Dec. 8. Thirty-six of the forty-four "old boys" were present, and all business discussion were strictly forbidden, the time being spent in recalling the days before the Steel Corporation absorbed their company.

The National Brake & Electric Co., Milwaukee, which has recently completed extensive improvements, additions and enlargements, has increased its capital stock from $1,000,000 to $2,000,000.

NEW TIN HOUSE

Being Erected by the N. & G. Taylor Co., at Cumberland—Will Have Complete Plant.

Contracts have been let by the N. & G. Taylor Co., of Philadelphia, manufacturers of tin plate, for the erection of a complete tin house at their Cumberland, Md., plant, which has been devoted to the production of black plate only. This black plate has previously been tinned at the Philadelphia works. The new addition will comprise the latest ideas in tin house construction, especial attention having been given to ventilation, lighting and mechanical transportation of materials within the buildings. A new electric generating set is being added to the electric power plant, and the present laboratory is being doubled in size. A large store warehouse for the storage of black plate will adjoin the tin house. With the completion of these improvements and additions the company will have at Cumberland every process of the manufacture of tin plate from the pig iron and pig metals through to the finished sheet. Through an agreement with the Cumberland city council regarding the new improvements, the company has been granted free water to the extent of 200,000 gallons a day, and immunity from taxes for a period of 10 years. The N. & G. Taylor Co. was established in 1810 and is now entering upon its 103rd year of continuous business activity.

Erects Brass Rolling Mill

The Chase Rolling Mill Co., Waterbury, Conn., brass manufacturer, advises that it is erecting a new rolling mill, 120 x 300 feet, at Waterville, Conn., to provide space for its own growth and that of other concerns in which it is interested.

The Robb Engineering Co., Ltd., South Framingham, Mass., reports recent sales to the following companies: Merrimac Chemical Co., North Woburn, Mass.; Plimpton Press, Norwood, Mass.; J. A. Lord, Peabody, Mass.; American Agricultural Chemical Co., F. S. Carr Co., South Framingham, Mass.; C. J. Norwood, Ipswich, Mass., and R. Wolfenden & Sons, Attleboro, Mass.

The Milwaukee Valve Co., brass founder, Milwaukee, has increased its capital stock from $36,000 to $100,000 to provide for extensions of the business.

EXPORTS GAIN

Being the Largest Since April.—Great Tonnage For The Year.

Exports of tonnage iron and steel products in October showed a gain of 3 per cent over those of September, and were the largest since April, exceeding all monthly totals in the export movement with the exception of that month and the March preceding.

The total exports of iron and steel products made a similar record in October, passing the value in any preceding month with the exception of March and April of this year.

The total value of the iron and steel exports, and the total weight of the tonnage lines for the 10 months of this year through October both exceed all previous records for full calendar years.

Assuming exports in November and December to be equal to those of October, exports of the tonnage lines this year promise to make a total of 2,175,000 gross tons, 42 per cent in excess of the total in 1910, which year has held the record by a comfortable margin.

No important change in the character of the export movement has occurred lately. A new item appears in our monthly table, however, as there is now included the item "Cast radiators, etc.", which covers radiators and cast iron house heating boilers. The government started reporting these by weight July 1, 1910, and as the item is now included in our monthly table, the monthly totals since July 1, 1910, have been revised to include this item.

Imports of iron and steel showed a sharp increase in October, though the total was not as large as in the early months of the year. Our iron and steel imports by months are shown in the following table:

IRON AND STEEL IMPORTS, GROSS TONS.

	October,		Ten months ending October,	
	1910.	1911.	1910.	1911.
Scrap	3,393	2,105	68,850	16,476
Pig iron	20,280	10.444	196,895	126,318
Blooms, billets and steel, n. e. s.	3,081	3,358	39,107	26,603
Wire rods	1,161	969	16,941	13,097
Bar iron	1,668	2,340	32,879	23,180
Structural	*	529	*	*1,156
Sheets and plates.	203	248	5,668	1,936
Tin plates	1,669	574	55,471	13,443
Tota's	31,455	20,567	415 811	222 209

*Not separately stated prior to July 1. 1911.

IRON AND STEEL EXPORTS, GROSS TONS.

	October,		Ten months ending October,	
	1910.	1911.	1910.	1911.
Scrap	1,687	7,511	18,554	69,523
Pig iron	11,229	6,386	95,091	101,711
Billets, sheet bars, etc.	15,493	21,783	29,655	202,961
Wire rods	2,543	3,375	19,440	16,205
Rails	19,542	22,918	283,324	372,861
Steel bars	10,708	9,474	89,642	103,190
Iron bars	1,052	1,208	15,980	15,087
Structural	9,942	19,134	124,494	177.591
Hoop, band and scroll.	*	665	*	*2.254
Sheets and plates	22,569	37,470	225,179	289,751
Tin plate	552	7,117	8,947	49,674
Barb wire	8,136	11,704	62,770	74,845
All other wire.	7,038	11,170	74,778	105,630
Cut nails	1,107	697	6,477	8,983
Wire nails	3,635	4,964	35,918	40,123
All others, including tacks	925	1,425	8,334	11,026
Pipes and fittings	14,167	18,613	132,268	163.431
Cast radiators, etc.	503	620	†1,391	3,270
Totals	129,828	186,234	1,232,698	1,809,096

*Not separately stated prior to July 1. 1911.
†Not separately stated prior to July 1. 1910.

Iron and Steel Imports.

	1910.	1911.
January	56,207	32,795
February	43.613	20,455
March	54,176	23,533
April	47 698	22,392
May	42,569	23,376
June	30,322	29.395
July	41,933	15,456
August	76,879	19,746
September	30,961	13,881
October	31,455	20,567
November	40,585	
December	31,576	
Totals	487,972	222,209

Iron Ore Imports.

Iron ore imports by months have been as follows:

	1909.	1910.	1911.
January	105,233	284,823	102,600
February	61,749	170,427	94,820
March	108,676	163,633	134,785
April	74,782	206,135	133,900
May	97,393	240 833	217,467
June	124,714	193,415	118,296
July	172,316	248,810	200,845
August	209,855	282,949	175,183
September	164,613	208,892	184,456
October	178,051	219,571	172,459
November	174,966	197,833	
December	222,609	173,710	
Totals	1,694,957	2,591,031	1,534,811

Sources of iron ore imports this year are shown in the following table:

	October	Ten months.
Spain	18,720	183,382
Sweden	30,329	183,491
Canada	470	40,224
Newfoundland	12,273	142,553
Cuba	105,140	961,099
Other countries	5,527	24,062
Totals	172,459	1,534,811

Will Build New Foundry

The A. L. Swett Iron Works, Medina, N. Y., manufacturer of hardware and plumbers' specialties, advises in respect to the fire which occurred at its foundry recently that it had to construct an entirely new roof and install a complete new line of equipment, with the exception of the cupola and blower. The company, nevertheless, succeeded in pouring off a heat on Dec. 9, just two weeks from the date of the blaze. The foundry walls, being of solid masonry, were not harmed to any extent. The company now has about 20,000 square feet of floor space, but expects to built a foundry next summer, which will be considerably larger and will be an up-to-date plant in every way. The plans for the proposed building are not yet completed.

Machine Company Expands

The Hall & Brown Woodworking Machine Co., St. Louis, has increased its capital stock from $200,000 to $250,000. It has also purchased all of the stock of the Yerkes & Finan Woodworking Machine Co., also of St. Louis, and will continue to operate that company's plant at Ninth and Dock streets.

The Mumford Molding Machine Co., Plainfield, N. J., has furnished a 24-inch jolt - ramming molding machine, having a capacity of 24,000 pounds, to the Canadian Rand Co., Sherbrooke, Quebec.

Coremakers of the Aluminum Castings Co., Detroit, went on strike, Dec. 6.

VALUE OF IRON AND STEEL EXPORTS—TONNAGE AND NON-TONNAGE.

	1907.	1908.	1909.	1910.	1911.
January	$ 14,327,926	$ 13,468,058	$ 10,329,388	$ 14,513,394	$ 18,739,961
February	13,946,842	14,063,559	10,947,159	13,949,082	18.690.792
March	16,419,116	15,168,155	13,874,461	17,258,503	22,591,845
April	17,684,863	15,455,319	13,058,054	16,529,254	24,917,056
May	14,594,043	11,281,415	12,993,197	17,658,042	20,616,795
June	17,226,259	11,677,944	13,779,736	16,503,204	20,310.053
July	17,614,017	12,085,951	11,866,772	16,108,102	18.052,337
August	17,587,181	12.058,561	14,136,219	17,628,538	20,701,154
September	16,830,160	11,221,799	12,966,908	16,776,178	20.534.139
October	18,786,750	11,505,063	14,249,598	17,452,085	20,799,591
November	17,051,755	10,895,549	14,434,690	18,593,806	.....
December	14,997,869	12,231,741	15,075,183	18,300,710	.....
Totals	$197,060,781	$151,113,114	$147,680,331	$201,271,903	$205,918,252

EXPORTS OF TONNAGE LINES—GROSS TONS.

	1907.	1908.	1909.	1910.	1911.
January	102,630	74,353	70,089	118,652	152 360
February	87,912	81,773	84,860	110.224	150,919
March	112,787	96,681	94,522	124.980	215,888
April	132,790	93,285	100,904	117,921	228,114
May	91,543	64,041	109,977	135,306	178,428
June	92,996	69,770	114,724	120,601	174,248
July	122,240	86,796	100,680	128,216	162,929
August	118,792	86,244	105,694	131,391	177,930
September	114,819	76,732	97,392	119,155	181,086
October	123,170	85,766	110,821	129,828	186,234
November	116,309	71,130	115,943	155,138	.....
December	86,019	77,659	137,688	150,116	.....
Totals	1,301,979	964,242	1,243,467	1,537,952	1,809,096

MAY BUILD SMELTER

Such a Proposition Being Considered in the Mahoning Valley.

The building of a zinc ore smelter somewhere in the Mahoning valley near Youngstown or Niles, O., is being considered. The promoters are of the opinion that such a plant in this territory would tend to protect them from the wide fluctuations in the spelter market. The consumption of spelter in and around Niles and Youngstown amounts to about 3,000 tons a month, while 3,000 tons additional is used within a radius of 50 miles from these two places.

Made Production Record

The Carnegie Steel Co. during the 24 hours ending Friday, Dec. 8, made a new high production record at its open-hearth steel plant, Homestead, Pa. During this period the No. 3 open-hearth plant, consisting of 24 furnaces, made a production record of 3,961 tons, as compared with 3,717 tons, the previous high record. Rowle Bostwith is superintendent of the plant.

Personal

G. Wickersham has been appointed general manager of the Diamond Forge & Mfg. Co., Pittsburgh, succeeding D. R. Wilson, resigned.

Walter B. Snow, publicity engineer, Boston, announces the recent addition to his staff of Sidney G. Koon, M. M. E. and John S. Nicholl, B. S.

George E. Slater, who has been with the Republic Iron & Steel Co. in its Milwaukee offices, has been transferred to the company's offices at Cleveland.

S. T. Wright has been made resident manager for the United States Cast Iron Pipe & Foundry Co., at Burlington, N. J., succeeding J. Arthur Hayes, who recently resigned.

Francis W. Frost, formerly secretary and treasurer of the Engineering News Publishing Co., has been elected to the office of vice president and treasurer of Suffern & Co., 96 Wall street, New York City.

H. A. Quackenbush, formerly a salesman with the Carnegie Steel Co. at Philadelphia, has been transferred to the Cleveland office of the same company, where he will serve in a similar capacity.

Ralph T. Rowles, who has been connected with the sales office of the Carnegie Steel Co., at Philadelphia, has attached himself to the Philadelphia office of the Jones & Laughlin Steel Co. and will act as a traveling representative among the trade of that district.

J. E. Perry has been appointed assistant to President T. J. Bray, of the Republic Iron & Steel Co., in charge of the coke and coal properties of the northern district, effective Dec. 1. Mr. Perry has been secretary to President Bray and prior to that, secretary to President Guthrie.

C. A. Hamilton, who for the past six years has been vice president and general manager of the Wisconsin Engine Co., Corliss, Wis., has resigned his position to take an interest in the Lavigne Gear Co., a new corporation organized for the purpose of manufacturing automobile steering gears and accessories. Mr. Hamilton has been elected vice president and general manager of the Lavigne company with general offices at Milwaukee.

Frank C. Cunningham, superintendent of the finishing mills of the Republic Iron & Steel Co., at Haselton, O., will succeed Harry Parrock, superintendent of the Brown-Bonnell plant, when Mr. Parrock retires Jan. 1, to take a municipal position. Mr. Cunningham will be succeeded at Haselton, by H. J. Steinbreder, superintendent of the Mahoning valley works, who, in turn, will be succeeded by Oscar Black, assistant superintendent of the Mahoning valley plant.

At a meeting of the board of directors of Manning, Maxwell & Moore, held Nov. 24, W. H. McIntyre was elected first vice president and general manager. Mr. McIntyre was born in New York. He began his business career with the Equitable Life Insurance Co., in 1879, as office boy, and rose to the office of fourth vice president of the insurance company. This position he filled until a short time ago, when he resigned to enter the machinery business. One of the first steps taken in his new office was to summon all branch managers to the home office and put himself in personal touch with the men who are to carry out his policies. The meeting was characterized by a high degree of enthusiasm.

The Lumen Bearing Co., Buffalo, has recently made the following changes in its organization: H. P. Parrock, formerly western representative, has been appointed sales manager succeeding Allen Kendall, resigned; H. F. Russell, formerly purchasing agent, has been appointed sales representative in central and western New York and eastern Pennsylvania; Albert Lockwood succeeds Mr. Russell as purchasing agent; Louis S. Jones has been appointed sales representative in New England; H. O. Schwaner will represent the Lumen Bearing Co. in the Pittsburgh district and Fred Ganderton, formerly associated with the Aluminum Castings Co., Cleveland, has been appointed sales manager of the Toronto, Ont., plant.

Obituary

Albert H. Stevens, secretary of the Newark Wire Cloth Co., Newark, N. J., died Dec. 3, at his home at Belleville, N. J.

James Howe, for many years superintendent of the wire and rod mill department at the Detroit Copper & Brass Rolling Mills, died Dec. 2, aged sixty-two.

Richard N. Durborow, general superintendent of motive power of the Pennsylvania lines east, with headquarters at Altoona, Pa., died in Philadelphia Dec. 9, aged 51. He entered the company's service in 1879, as an apprentice.

John Gow, assistant foreman of the foundry department of the General Electric Co., Schenectady, N. Y., died Nov. 24, of pleuro-pneumonia, at the Physicians' hospital, Schenectady, N. Y., aged 46. Owing to his untiring efforts, hand molding in this company's casting plants has been almost entirely displaced by molding machine operations. He invented many labor saving devices.

Hugh Coll, for many years superintendent of the water system of the H. C. Frick Coke Co., died Nov. 28, at his home near Easton, Md. Mr. Coll was born in Ireland, in 1838. He came to this country at an early age and for several years was identified with several of the manufacturing concerns in the Pittsburgh district. In 1886, Mr. Coll entered the employment of the H. C. Frick Coke Co., and later was made superintendent of the company's water system, retiring four years ago.

Dinner For Schwab.—A testimonial dinner to Charles M. Schwab, president of the Bethlehem Steel Corporation, is being planned to be held in Philadelphia, Jan. 17, under the auspices of the Manufacturers' Club of that city. The affair for which arrangements are now in the making will probably be given at the Bellevue-Stratford hotel.

A Modern Fluorspar Mining and Milling Plant[1]

Description of the Rosiclare, Ill., Fluorspar Operations—Mining and the Preparation of the Ore for the Market

By Ernest F. Burchard

Fluorspar, a compound of calcium and fluorine, CaF_2, is a crystalline, clear or colored, glass-like substance. It occurs in fissure veins cutting limestone, sandstone and shale. Such veins often follow fault fissures, and are not remote from intrusive igneous rocks. Fluorspar, therefore, occurs in associations similar to those of lead and zinc ores, and, in fact, is often found with those ores. The other principal veinstuffs accompanying fluorspar are calcite and quartz, and clay is also found in openings where it may have been carried down from the surface. Fluorspar has been mined in Arizona, Colorado, Illinois, Kentucky, New Hampshire, New Mexico and Tennessee, but only Illinois and Kentucky have so far been important producers of this mineral, and of these two states, Illinois produces by far the greater quantity.

Production and Markets.

Fluorspar is a mineral of relatively moderate commercial value as compared with metallic ores mined under similar conditions. According to the latest reports of the United States Geological Survey, there were 69,427 short tons of domestic fluorspar, including gravel, lump and ground varieties, marketed in the United States in 1910, at an average value of $6.20 a short ton. Of this total, 61,136 short tons were sold as gravel and lump spar, at an average value of $5.58 per ton at the mines, and 8,291 short tons were sold ground, at an average value of $10.72 a ton, f. o. b. cars.

Fluorspar is used principally in the iron and steel industries, in which it is used as a flux in blast furnaces and in basic open-hearth steel furnaces. It is estimated that about 80 per cent of the American fluorspar output, mainly in the form of gravel spar, is consumed in the manufacture of basic open-hearth steel. It is also used in the manufacture of glass and of enameled and sanitary ware, in the electrolytic refining of antimony and lead, the production of aluminum and the manufacture of hydrofluoric acid. The use of fluorspar is increasing in practically all of these industries.

The demand for American fluorspar at Pittsburgh, Birmingham and other steel making centers during 1910 was apparently greater than the capacity of the mills operating in the Illinois-Kentucky district. Although the imports were exceedingly high, notwithstanding the import duty of $3 per ton imposed in 1909, the market for domestic spar does not appear to have been seriously affected by the quantities of fluorspar imported.

The conditions in the open-hearth steel industry have a direct bearing on the production of fluorspar, since the greater part of the gravel spar produced is used in the manufacture of basic open-hearth steel. The increase in the quantity of basic open-hearth steel in 1910, as compared with 1909, amounted to 1,874,857 long tons, or nearly 14 per cent.

The Rosiclare Deposits.

The fluorspar deposits of southern Illinois, which are the largest and richest yet discovered in the United States, occur in Hardin and Pope counties on the Ohio river, about 75 miles above Cairo. This district was

[1]Published by permission of the director of the United States Geological Survey.

FIG. 1—A VIEW OF THE BOILER HOUSE, MILL AND JIG HOUSE FROM THE SOUTH

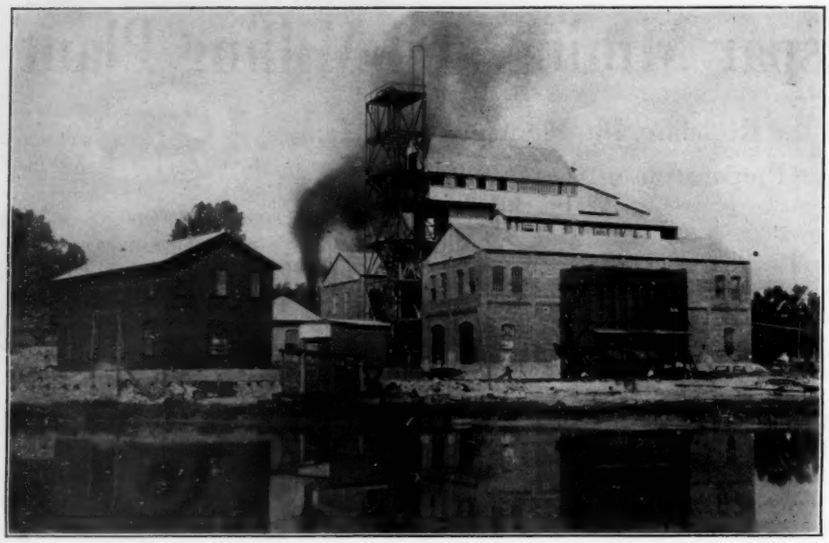


FIG. 2—ANOTHER VIEW OF THE MILL, SHOWING THE STORE HOUSE AT THE LEFT, JIG HOUSE, AND A STORAGE BIN IN THE FOREGROUND

studied and mapped by Dr. H. F. Bain, of the United States Geological Survey, in 1903, and his report was published as Survey Bulletin No. 255. From year to year the survey gathers the statistics of fluorspar production and notes the developments of the district in the annual volumes of mineral resources. The deposits occur in veins filling fault fissures. The vein material consists essentially of fluorspar and calcite. Associated with these minerals are minor quantities of the lead and zinc sulphides, galena and sphalerite. The veins in the immediate vicinity of Rosiclare and Fairview, Hardin county, have been exploited to the greatest extent, and are probably the most extensive in the district. Mining has been carried on almost continuously along the vein on properties of the Rosiclare and Fairview mines, a distance of more than a mile, first on the outcrop, and then underground, by means of shafts and stopes. For the greater portion of this distance the stopes have been 10 to 20 feet wide in rather clean ore, but the vein is much narrower in places. The ore has been proved to a depth of more than 500 feet in the Fairview shaft and to 335 feet in the Rosiclare shaft, and it is probable that it will be found to extend to a greater depth than will be practicable to mine it. The accompanying table contains a number of chemical analyses of cleaned spar from the Fairview-Rosiclare vein.

The Mine and Mill.

Fluorspar is mined at the Rosiclare lead and fluorspar mines by overhead stoping, as shown in Fig. 8. One shaft, 335 feet deep, is operated here, but the main level is 235 feet below the surface. Local pinching and swelling is characteristic of the vein, the width ranging from a few inches to 22 feet. There are large quantities of good ore still available above and below the main level, in both directions from the shaft, but in places large bodies of calcite are encountered.

A new steel mill has been built at the Rosiclare mine designed to process 500 tons of crude ore per day. Several new features are being successfully exploited at this mill. The mine shaft has recently been reconstructed and consists of three compartments, two of which are for hoisting, 5 feet 5 inches x 4 feet 4 inches, and one pump compartment, 5 feet 5 inches x 3 feet 8 inches. The mill consists of three large buildings, shown in Figs. 1 and 2. The sizing and sorting building, with the shaft at the south end, is in the center. The power house and grinding building and the concentrating or jig house plant are on either side of the sizing and sorting building. All the buildings are approximately 90 feet long. The middle building is 20 feet wide at the base, and the two other buildings are 36 feet wide. The alleys between the middle building and the two other buildings are 14 feet 6 inches wide. The height to the top of the head frame at the center of the wheel above the shaft is 84 feet. The height to the roof of the middle building is 71 feet 6 inches.

The height to the grizzly is 59 feet, to the screen floor, 37 feet 6 inches and to the picking floor, 25 feet. The two outside buildings are 30 feet high to the eaves, and the height to the mill floor in the grinding building is 15 feet. The frame of the middle

Analyses of Cleaned Fluorspar.

Calcium fluoride, per cent.	Silica, per cent.	Alumina and iron oxide, per cent.	Calcium carbonate, per cent
88.35	3.4	1.45	8.96
87.07	3.12	....	8.96
86.31	4.30	....	7.57
86.60	2.38	....	10.94
85.35	8.17	....	4.50
83.49	4.00	....	7.67
84.80	3.51	....	8.29
84.50	3.85	....	8.27
85.63	3.82	....	9.21
88.67	5.13	....	4.49
85.61	6.05	....	4.22
85.57	6.76	....	2.26
86.10	7.39	....	2.14
86.87	4.73	....	4.44
98.27	0.58	....	0.27
96.62	1.67	....	0.79
98.30	0.46	....	0.46
95.38	0.47	....	3.55

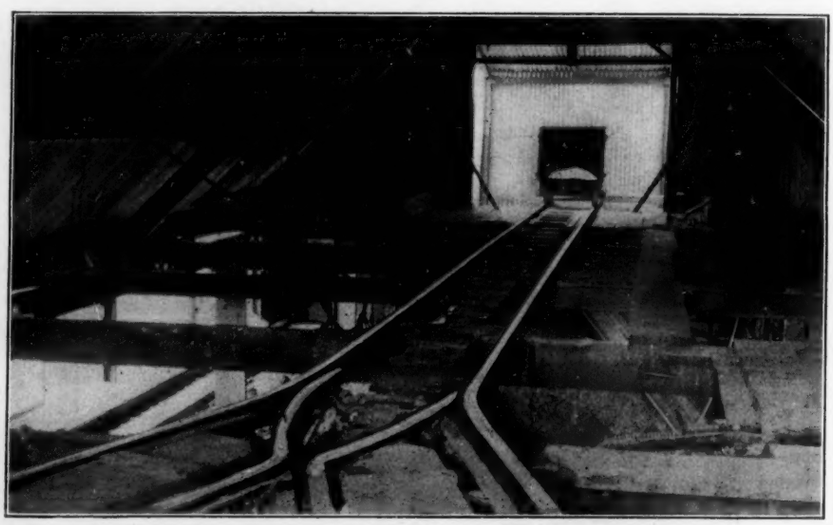


FIG. 3—TOP OF THE MILL DIRECTLY OVER THE GRIZZLIES

building is steel, and the covering down to the picking belt floor consists of galvanized, corrugated sheets. The floor of the grinding room and machine shop is concrete, supported by high-ribbed, steel arches. The walls of the outside buildings are brick, and the roofs are corrugated steel.

The power plant equipment consists of two 150-horsepower Chandler & Taylor boilers, and two 200-horsepower boilers made by the Lyons Boiler Works. Kentucky coal is used. Induced draft is employed, the fan having been furnished by the American Blower Co., Detroit. In the engine room are installed Ball engines of 125 and 175-horsepower capacity each; one Ingersoll-Rand air compressor with a capacity of 550 cubic feet, and one Ingersoll-Rand straight-line type compressor with a capacity of 1,100 cubic feet. Electrical power is supplied by a Westinghouse 75-kilowatt generator, direct-connected to a Ball engine, and a Fort Wayne 125-kilowatt generator also connected to a Ball engine. The water supply is taken from the mine, and is softened by a water softener and purifier, having a capacity of 6,000 gallons per hour. There is also employed a 600-horsepower water heater which utilizes the exhaust steam. The water supply system comprises a supply tank on the hill at the west of the mill, having a capacity of 10,000 gallons. A pump having a 4-inch discharge and a capacity of 375 gallons a minute handles the mine water. Barrels for the ground spar are made in the mine's cooper shop.

From the mine the spar is hoisted to the top of the mill in one-ton steel cars having side dumps and gable bottoms. From the cage the cars are run out on a steel platform from which they are diverted to tracks running out over grizzlies. The spar is dumped on the grizzlies, which are constructed of steel bars, 1½ inches wide, ¾ inch thick on top and ½ inch thick underneath, spaced on 2½-inch centers. The grizzlies are inclined toward two 24-inch steel apron conveyors on each side. From the over size, No. 1 lump spar is picked and thrown on the conveyors. The common spar not passing the grizzly, is shoveled into crusher. The total capacity of the grizzlies is about 100 tons of material at one time. The material passing the grizzly and the crusher feeds down into two 150-ton steel bins on the floor below. These bins feed into two shaking screens on the floor next below. These screens have steel frames, 17 feet x 2 feet 9 inches, with bottoms of heavy wire with meshes about ½ x 1⅛ inches. The lump spar is delivered by the apron conveyor to a rotary drier, 25 feet long and 36 inches in diameter. The drier is supplied with hot air from the top of the boilers, which is blown through the system at the rate of about 1,100 cubic feet a minute. As the ore leaves the drier it falls on a butterfly, which diverts the material as desired, either into a bin for No. 2 lump spar or through a modified Edison tower into a crusher. The hot air ascends through the tower and the chute, giving the ore the benefit of a longer exposure to the heat. The No. 2 lump spar may be drawn directly from the bin, barreled and shipped. The No. 1 spar passes through the crusher, which feeds by gravity into a motor-driven Griffin mill. Space has been left in the compartment in which the Griffin mill is situated for two additional grinding units. The crusher and mill are located on a concrete pier built partly above the level of the second floor. The Griffin mill discharges through a 30-mesh, 30-wire screen into a screw conveyor, which moves the ground spar at the rate of about 47 feet a minute to four storage bins. Each bin feeds into barrels which stand on packers. The barrels weigh 550 to 610 pounds when filled. The capacity of this packing room is about 10 barrels per hour, or 30 tons a day.

FIG. 5—CRADLE INCLINE AND A BARGE THAT IS BEING LOADED WITH FLUORSPAR

FIG. 4—A VIEW OF ONE SIDE OF THE GRIZZLIES

Ore Separation.

From the shaking screens the undersize is carried by water through a 9-inch pipe to the jig house, while the oversize of the screens falls on a picking belt, on which 9 to 15 men may work. On the picking belt separation is made by hand of the larger fragments of lead and zinc ore, calcite, waste and fluorspar. Lump spar can thus be picked, if desired, in order to increase the quantity secured by picking on the grizzly above.

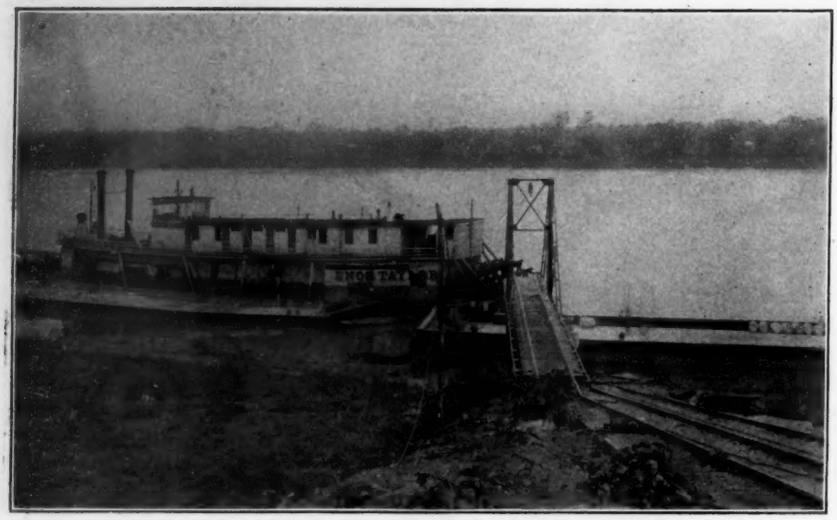


FIG. 6—INCLINED CRADLE AND BARGE ON THE OHIO RIVER

The waste and calcite are thrown directly to chutes leading to their respective bins, while the lead and zinc ores pass through short chutes to separate troughs just below the picking belt, and are moved by a double shaking conveyor to separate, 13-inch disc crushers. The overrun of fluorspar from the picking belt passes in the opposite direction to a 24-inch disc crusher. The lead and zinc ores, discharged from their respective disc crushers, are carried by water through pipes to pulsator jigs in the jig house. From the 24-inch disc crusher the spar and fine lead and zinc ores are fed into a bin. This bin feeds into the same service pipe which receives the undersize from the shaking screens. This service pipe feeds into a rougher jig containing five cells. The ore from the rougher jig is delivered to a cleaner jig having six cells. Provision is made for catching the lead from the rougher jig and for taking care of the tailings. Between the rougher jig and the cleaner jig are sand crushers and several pumps, and the system is very flexible. A trommel and another 13-inch disc crusher treat all material over ½ inch in size before it enters the rougher jig. The lead and zinc ores coming from the disc crushers are treated by two four-cell pulsator jigs, having a set of laboratory rolls. About 90 per cent of the normal ore consists of concentrates of fluorspar, galena and sphalerite (zinc blende). The galena recovered constitutes about 1 per cent of the concentrates, and the sphalerite still less. It is planned to treat a large quantity of rich tailings from the old mill as soon as there is an opportunity.

The milling of fluorspar offers rather difficult problems, for unlike most ores, the bulk of the product must be saved, and the waste which must be eliminated constitutes relatively a small percentage. In addition, the separation of the lead and zinc from the fluorspar is difficult, particularly where such small percentages of the former minerals are present, yet it is essential that they be almost completely removed, since the presence of sulphide ores renders the fluorspar of little value as a flux in steel-making. Moreover, if the separation can be completely and economically effected, the lead and zinc ores recovered materially assist in paying the expense of cleaning the ore.

The products of this mill, lump, ground and gravel spar, are carried to the Ohio river over an electric tramway 3,300 feet long, and are then loaded on barges and towed to Shawneetown, Ill., Evansville, Ind., and to Golconda, Ill. The river may be closed to navigation by ice for a short period in the winter, or by low water for a short period in the summer, and to protect their customers the Rosiclare mines endeavor to maintain a stock of about 3,000 tons of fluorspar of all grades on the tracks of the Baltimore & Ohio Southwestern railroad, at Shawneetown, Ill. Duplicate boiler, air compressor, and current generating units are maintained to provide against breakdowns in the power plant. A large Prescott mine pump has been installed at the bottom of the main shaft to supplement the main pumping outfit in emergencies.

The Rosiclare mine has had a unique and interesting history. The

FIG. 8—NORTH HEADING IN MINE AT THE 335-FOOT LEVEL

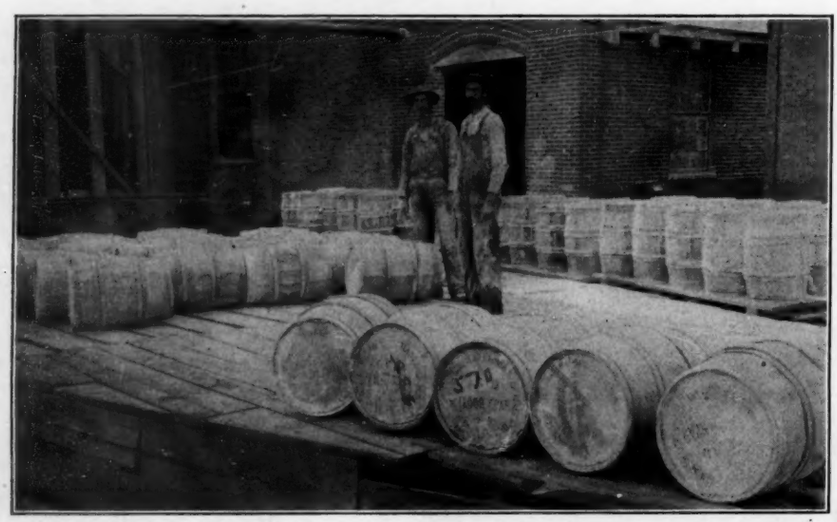


FIG. 7—A LOADED TRAIN OF THREE ELECTRIC TRAM CARS IS SHOWN IN THE BACKGROUND. ACID AND GROUND FLUORSPAR IS SHIPPED IN BARRELS

mine is the property of John R. McLean, of Cincinnati. It has been operated continuously for 70 years, the greater part of this time in possession of Mr. McLean and his ancestors. The local superintendent is W. A. Moore. For the last three years the products of the mine, consisting of selected lump, gravel, ground and acid ground grades of spar, have been sold and distributed by Rogers, Brown & Co., Cincinnati.

The Coke Fields of the Pittsburgh District[1]

Characteristics of the Various Products—Types of Ovens, Their Forms of Construction and Methods of Operation—A Hint to Consumers

By Brooks J. Goodin

The foundry coke made from the Connellsville vein of coal varies greatly in analysis, according to the part of the region from which it comes, although the physical structure has the same general characteristics, being large and hard and presenting a bright silvery appearance when first drawn from the ovens.

For descriptive purposes we will divide the Connellsville vein into three parts, namely, the Latrobe, at the north end of the region and adjacent to the town of that name; the high sulphur district at the southern end of the region; and the old basin between the two.

In the Latrobe field, which should not be confused with the Greensburg field, which I shall take up later, the plants are located north of the main line of the Pennsylvania railroad and Loyalhanna creek. Practically all of these operations produce high sulphur coke, that is, coke that will analyze over 1 per cent in sulphur, though the structure is very large and tough and the loss from breakage in handling is comparatively small. The analyses of the majority of the cokes produced in the Latrobe field show sulphur 1.25 and upward, and ash 10 to 12.50 per cent. Some Latrobe coke is used successfully by quite a number of eastern foundries.

High Sulphur Coke.

In the high-sulphur Connellsville region, which is located south of Fairchance, the coke is in almost every case high in sulphur, though as in the Latrobe fields, it has good physical structure and where sulphur is not a vital element, it can be used to advantage. For instance, a number of sash weight manufacturers use this coke successfully.

The limits of the Connellsville low sulphur region proper are generally conceded to be the Pennsylvania railroad and Loyalhanna creek on the north, and a line drawn east and west through the town of Fairchance on the south, and the average plant within these limits produces low sulphur coke with excellent physical structure, provided, however, that proper care is taken in the mining of the coal and, if the coke is to be used in a cupola, that the culling of soft, spongy material is done before loading on cars.

John Fulton, one of the greatest authorities on coke, gives the following analysis as to what constitutes standard Connellsville coke:

	Per cent.
Moisture	0.79
Volatile matter	1.31
Fixed carbon	86.38
Ash	11.54
Sulphur	0.695

This analysis is a very fair average of the bulk of the low sulphur cokes with the exception of the sulphur. The percentage of sulphur that Mr. Fulton gives is, I believe, lower than this element runs in the majority of the cokes produced, the average being nearer 0.80 to 0.95 per cent.

The area covered by coal in the Greensburg district is approximately three miles wide by 15 miles long, and its limits are County Home on the southwest branch of the Pennsylvania railroad, to New Alexandria, on the Pennsylvania railroad branch of that name. All the plants operating in this field, with one or two exceptions, prepare the coal that is to be made into coke by washing, for the coal in its natural state is too high in sulphur for the coke made from it to be used successfully by the average founder. However, the plants that do wash their coal produce a good coke of large structure and one that will almost always analyze under 1 per cent in sulphur and 12 per cent or under in ash. A number of operators in this field make a specialty of producing foundry coke.

The lower Connellsville region is the latest district to be fully developed and extends approximately from Redstone creek on the northeast, to the Monongahela river on the south and west. This vein is today generally called the Pittsburgh seam. The coke produced shows a wide divergence as to chemical analysis, some of it analyzing uniformly 0.80 in sulphur or below and some as high as 1.50 to 2 per cent, although almost all of both the low and high sulphur coke is low in ash, analyzing as a rule below 11 per cent. The main physical characteristic of the coke is that it has what is known as the cross fracture and it breaks into smaller pieces than the old basin Connellsville coke.

While the coke from this field is smaller than that made from the Connellsville coal in the old region and up to about a year ago it was thought that large bulky coke could not be made from lower Connellsville coal without pulverizing or washing, a test was made at one of the older plants in the old region in small ovens with coal from a lower Connellsville mine, and the coke made was of good structure, equal to old region coke.

Whether this reversal of form was due to the small 11-foot oven or to the peculiar character of the coal from that particular mine, I do not know, but the fact remains that at the old plant large coke was made with the lower Connellsville coal. However, if reasonable care is taken in culling the coke and loading the cars, the results obtained from the use of Klondike or lower Connellsville coke should equal that of the best cokes from other regions.

Monongahela River Coke.

The coal along the Monongahela river is generally higher in sulphur than that a few miles east of it. The operators who have plants located along the river are now doing what the Greensburg operators have done, that is, installing or have already installed washer plants, and in a majority of cases are successfully reducing the sulphur in the finished product to a point where it will come well within the limits of the standard

[1]Abstract of paper read before the Pittsburgh Foundrymen's Asociation, Dec. 4, 1911.

coke analysis. The ash is low, running from 9.50 to 11 per cent; the structure, large and hard. West of the Youghiogheny river, near Layton, Pa., are located several plants that produce a high grade coke low in sulphur and ash and of hard, flinty structure.

Outside of what are commonly known as the Connellsville and Lower Connellsville regions, there are several plants in Washington county that make coke of good quality and there is also one in Indiana county.

Washington county is practically and Green county entirely undeveloped as regards coke-producing fields, although in all probability in the future it is from these counties that you will have to draw your supply of fuel.

Northern West Virginia.

There are such a large number of veins of coal in the northern section of West Virginia from which coke is made, that I will endeavor only to give a brief outline of them. The highest grade cokes are made at plants located on the Morgantown & Kingwood railroad, in Preston county, and along the line of the Western Maryland. The products of these various plants are, as a rule, under 1 per cent in sulphur; in fact, they very often analyze as low as 0.75. The ash, however, is usually over 12 per cent, often running as high as 13.50 to 14 per cent. The coke is hard and large, but is considerably lighter in weight than Connellsville coke.

Almost all the fuel produced in northern West Virginia is used in the east and the demand for it in some quarters is very good.

Types of Ovens.

Coke is made in three types of ovens: The beehive, Mitchell, longitudinal or Belgian, and by-product.

As its name implies, the beehive oven resembles a beehive, being nothing more than the section of a vertical cylinder about 12 feet 6 inches in diameter, and 2 feet 8 inches in height, surmounted by a section of vertical dome. The total height of the interior is from 6 feet 6 inches to 7 feet 6 inches. At the front of the oven is an opening or door to allow the withdrawal of the coke.

These ovens are built side by side in long batteries or banks. A suitable loam filling then entirely covers the oven and dome, so that the whole battery forms one continuous block. Alternate ovens are charged and drawn so that each oven, when freshly charged, is fired by the heat of adjoining ovens already in blast.

The door is partially bricked up and the oven is charged with coal from a larry through an opening in the crown, the amount of such charge depending upon whether the coke is 48-hour or 72-hour. The charge is then leveled and the door bricked to the top with the exception of a small space to afford draft. The outside of the door is then luted with clay to render it air-tight. The heat stored in the oven walls and that transmitted from adjacent ovens soon raises the temperature sufficiently to ignite the gases, which begin to distill. This still further raises the temperature and the whole mass becomes pasty. There is at first a marked swelling with the fusion, but finally, as distillation progresses, the mass shrinks to a volume considerably less than the original. As the process is finally completed, the door is torn down and the oven watered, thus causing the bed of coke to contract and split so that it can be withdrawn.

The structure of the coke is distinctly columnar, being 18 to 20 inches long in the direction of the depth of the coke bed. Good beehive coke has a pronounced silvery white luster and throughout its mass are shiny nodules formed during distillation by the deposition of the carbon from hydrocarbons. There are also often fine, jet-black, hairlike filaments from the same source, an indication of good coke.

Mitchell, Belgian or Longitudinal Oven.

The Mitchell oven is a modification of the Belgian type, one difference being that it provides an improved combustion chamber. The process is identical with that of the beehive oven. In this type, there is an opening at both ends, consequently, the oven can be discharged in a few minutes by a pusher extending through the oven, thus utilizing practically all the heat for the next charge. The oven is immediately charged after pushing. The dimensions are approximately as follows: Height at the center, 7 feet 6 inches; height at end, about 4 feet width at pusher end, 4 feet 10 inches; width at discharge end, 5 feet, and length 32 feet.

In the by-product oven, as the name implies, special attention is given to the utilization of the by-products in the gases and the gases themselves, after the by-products are extracted, are available for fuel, as is the coke.

In general, the block of ovens form a series of narrow coking chambers or retorts from 16 to 24 inches in width, 5 to 6 feet high and possibly 30 feet long, with a door at each end. The walls of the coking chamber form flues through which a portion of the gases of distillation pass and when being burned heat the coal as it is freshly charged. In the by-product oven, the coal being in a comparatively thin body, is more quickly coked than in the beehive oven.

Since the coal cokes from the flue walls toward the center of the mass, the gases escape here, forming a cleavage plane, so that the coke is a little less than one-half the length of the width of the coking chamber. It is of a dark gray color and usually lacks the luster of beehive coke, owing to its being watered outside the oven.

It should be realized, that while the operators are constantly striving to improve the quality of their product, they are dealing with an uncertain raw material; that the process of manufacture is very crude and that they are compelled to use a very poor class of labor. It should also be remembered that the coke drawer's day commences in the early morning, usually from one to three o'clock, and that it is almost an impossibility for the yard foreman to personally supervise the loading of each and every car.

If the consumers of Connellsville foundry coke will take the trouble to post themselves as to the originating point of the coke or cokes that are best suited to their purpose, they will occasionally save both themselves and the seller trouble that well could be avoided.

Coal mining in Virginia has made important increases within the past generation. Although not a great coal state Virginia produced over six and a half million tons in 1910. The state is one of the earliest producers, the figures of the United States geological survey showing a small output as far back as 1822. In 1850 the production was 310,000 tons and at that time only two states stood above Virginia. While other states were forging ahead the increase in Virginia was slow until about 1895, when 1,368,324 tons were produced. In 1900 the production was 2,393,754 tons; in 1905 it was 4,275,271 tons; and in 1910 it was 6,507,997 short tons, the greatest in the history of the state.

The Pullman Co. has placed 1,000 additional employes at work since the car buying revival started.

Comparative Records of Foundry Operations

Defective Castings Report Sheet—Chart for Recording Production Costs —Record of Miscellaneous Operations

By G. E. Andres

In every foundry an accurate record should be available, not only of the number of defective castings produced, but of the causes that lead to these losses. In Fig. 1 is shown a report card which will prove a great aid to the foreman in ascertaining the number of defective castings produced by each molder, as well as the number broken. Frequently, the foundry foreman is expected to produce results without the proper data whereby he could improve the work of the shop. Casting losses are an important item that should receive careful consideration and the more information that can be imparted to the foreman on this subject the more rapidly he can improve the efficiency of the molding department. Although it is important that details of shop operations be recorded in the office, yet these records are of little value unless distributed among the department heads who are directly responsible for results. Records held in the office are of little value to the foreman in the shop.

Defective Casting Report.

It might be advisable for every foundryman to consider the following questions: Are you giving the foreman a fair opportunity to improve his work? What have you done to assist him? Have you directed his attention to certain patterns which are in need of repairs? Have you pointed out the men in the shop who are incapable and whose records are below the average? It is safe to say that few foundrymen assist their foreman in this way. Only too frequently the foreman has no knowledge of shop operations from the office records until the end of the month.

In a shop engaged largely on a standard line of work it is fair to assume that the foreman handles from 100 to 200 patterns per month. In addition, he must superintend the work of the shop employes, scheme new rigging, oversee the pouring and his other duties are almost too numerous to mention. It is almost impossible for the foreman to pick out all of the patterns which need repairs and for this reason he should be given a daily report of the number of defective castings which will give him a clue to the patterns which need attention. Frequently, by calling the foreman's attention to a certain pattern, new rigging can be devised and molding methods can be simplified. In this way the production costs will be greatly reduced. It is not uncommon to improve molding methods which will not only reduce the percentage of losses, but will likewise increase the output. If the foreman constantly receives information regarding defective work he will invariably apply himself and will devise schemes to reduce these losses. As new patterns are received, he will make comparisons with similar patterns previously made and thereby the new pattern can be properly molded in the foundry and the expense of experimenting with the pattern is saved.

DEFECTIVE CASTING REPORT

DEP'T. "A"

J. Smith FOREMAN HEAT OF 3/11/10

PATT. NO.	MADE BY CHECK	PIECES CAST	NUMBER BAD	NUMBER BROKEN
X-77	62	10	2	—
Z-110	179	18	10	—
S-42	99	6	1	—
T-3254	32	16	6	—
X-99	84	22	4	—
T-2119	52	8	6	1
S-770	61	14	2	—
Z-952	22	32	3	—
X-372	66	67	4	—
T-3799	34	20	12	3
Z-84	12	10	1	—
T-2419	10	16	2	—

PLEASE ATTEND TO

Patt. Z-110

" T-2119

" T-3799

FIG. 1—DEFECTIVE CASTING REPORT SHEET

On the defective casting report sheet a column is provided for the pattern number, the check number of the molder, number of pieces cast, bad castings and the number of castings broken. This report can be easily filled in as it is copied from the daily casting report which contains all of the information for this card. Defective castings are divided into two divisions, namely, pieces bad and number broken. The former sub-division covers the number of castings lost as a result of poor workmanship or pattern design, and indicates that the foreman's attention is required, particularly if the losses are heavy. Number broken include such castings as may have been properly made, but are broken when shaken out of the sand, or in one of the subsequent cleaning operations. Castings broken in this way are, of course, not the fault of the molder, nor can they be considered defective castings, as they are lost as a result of carelessness on the part of those handling the castings after they have been poured. The superintendent or general foreman should always receive a copy of this defective report to enable him to check patterns against the various departments and this will enable him to note improvements, if any result.

Molders' Report.

This report will also enable the foreman to notify the molders of the number of defective castings made. A small slip is handed each molder, as shown in Fig. 3, on which is entered the pattern number, number of pieces lost and the date of the heat. For example, it will be noted from Fig. 1 that the molder holding check No. 62 made ten castings from pattern X77. The next day a report of defective castings, Fig. 3, is handed to this molder, which notifies him that two of the ten castings were defective. If he is working on a piecework basis and is paid 40 cents for each casting made, his earnings for that day will total $3.20 in place of $4.00, which he would have received if all the castings would have have passed as satisfactory. If the molder has any doubts as to whether he has lost these two castings and desires to note molding errors, he can do so by inspecting the castings on the scrap pile and in this way many improvements can be brought about.

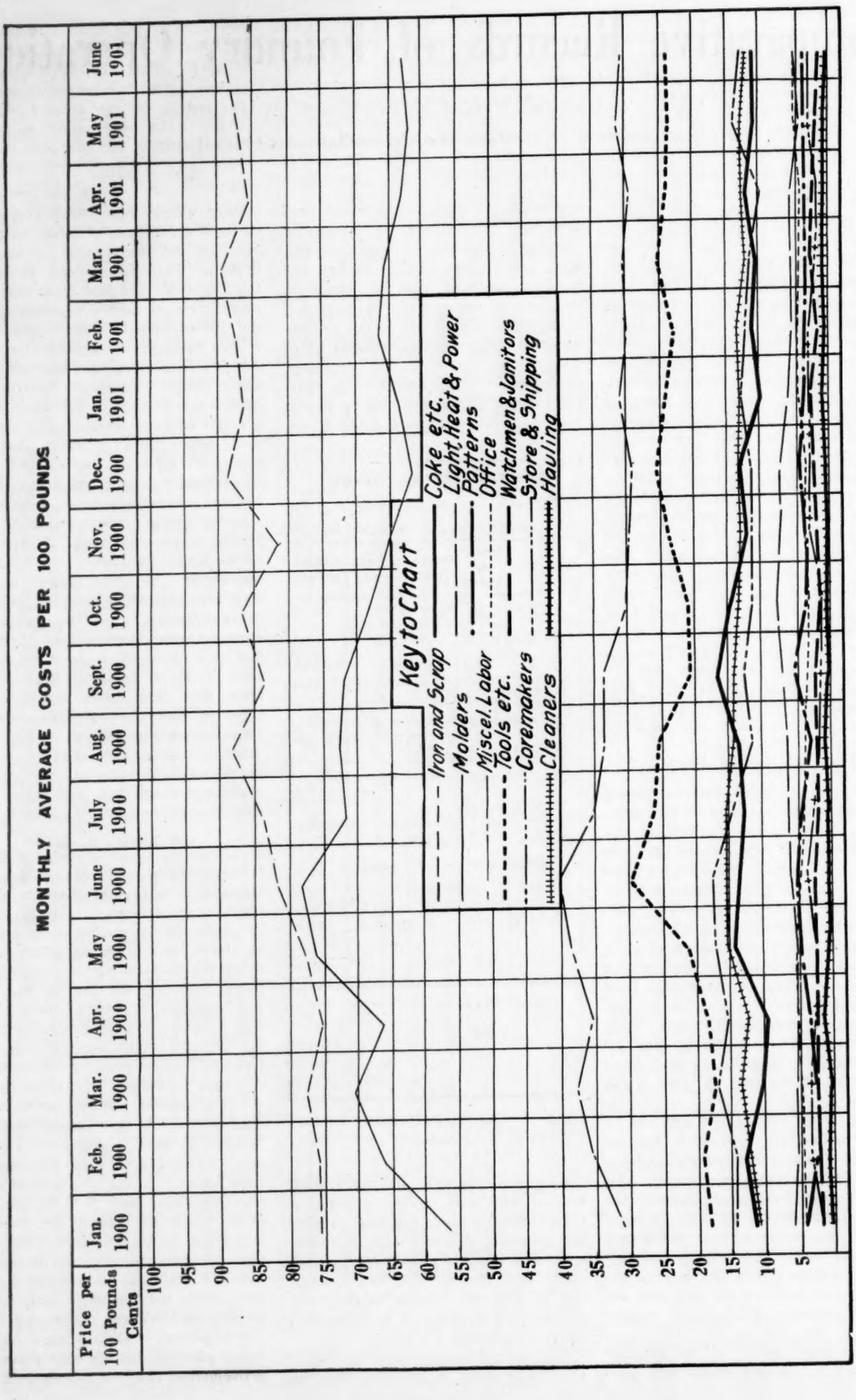


FIG. 2—CHART, SHOWING THE AVERAGE MONTHLY COST PER 100 POUNDS OF GOOD CASTINGS PRODUCED

It is advisable to invite the molders to inspect their defective work, as this frequently will prove an incentive that will lead to a clean report sheet for the following day.

By notifying the molders each day of their number of losses, many arguments which might develop on the regular pay day are obviated. Occasionally, a mold is perfectly made, but the loss of the casting is due to the blowing of the core and, therefore, this loss should be charged to the core department. The molder, after inspecting the casting, notifies the foreman that the loss should not be charged to him, and after the foreman's personal inspection, the molder is allowed the cost of making one mold. It will be noted in Fig. 3 that the molder holding check No. 62 was credited with one casting of the two lost. This slip is then returned to the office and the molder is credited with 40 cents which was the piecework price of molding one casting. By checking defective castings daily all differences with the molders are immediately adjusted and

DEFECTIVE CASTINGS

HEAT = 3/11/12. CHECK = 62.

2 Pieces, Patt. X 77

ALLOW 1. J. Smith = FOREMAN

FIG. 3—DEFECTIVE REPORT SLIP FURNISHED THE MOLDER

the result will be that the men will be better satisfied. It also might be added that with the elimination of pay-day arguments, particularly with men on a piecework basis, the accounting department is relieved of much difficulty.

In Fig. 4 is shown a report on which the materials used in the foundry during each month of the year are totaled. In addition to the total annual consumption, the monthly and daily averages are also given. Columns are provided for all the raw materials, such as pig iron, scrap, sand, coal, coke, limestone, charcoal and fire clay. This report furnishes the superintendent all of the necessary information regarding raw material consumption and enables him to make comparisons from day to day and month to month.

Comparative Cost Report.

A comparative cost report per 100 pounds of good castings produced is shown in Fig. 5. Columns are provided for the labor cost of molding,

SUMMARIES OF MATERIALS USED

MONTH	YEAR	PIG IRON POUNDS	SCRAP POUNDS	TOTAL IRON MELTED POUNDS	SAND POUNDS	COAL NET TONS	72-HOUR COKE NET TONS	48-HOUR COKE NET TONS	LIME-STONE NET TONS	CHARCOAL POUNDS	FIRECLAY POUNDS
JAN.	1900	1,396,150	1,355,100	2,751,250	1,196,062	167.71	118.40	31.40	34.97	36,350	42,410
FEB.	"	1,277,170	1,331,700	2,608,870	1,203,065	139.31	200.06	61.15	28.93	62,720	90,230
MAR.	"	1,156,350	1,091,600	2,248,450	987,730	130.21	149.17	16.20	24.34	37,980	91,070
APR.	"	1,323,480	1,326,620	2,650,100	927,815	167.15	184.35	44.07	33.68	31,470	110,100
MAY	"	1,404,300	1,233,030	2,637,330	1,416,940	230.45	234.17	44.01	20.20	69,480	55,000
JUNE	"	1,775,580	1,207,630	2,983,210	1,467,380	186.60	214.63	36.06	35.10	12,400	66,820
JULY	"	1,451,480	1,286,680	2,738,160	1,593,270	228.51	196.32	47.99	23.25	66,900	42,240
AUG.	"	1,348,820	1,031,850	2,380,670	1,360,530	203.45	179.74	31.66	15.58	47,490	101,000
SEPT.	"	1,567,300	924,900	2,492,200	1,837,205	205.05	187.35	86.29	15.60	30,520	50,290
OCT.	"	1,730,490	1,122,670	2,853,160	1,337,982	192.24	212.18	31.80	16.15	94,080	83,090
NOV.	"	1,390,540	883,620	2,274,160	1,162,810	299.44	267.16	14.62	23.40	30,330	44,280
DEC.	"	1,461,240	1,038,200	2,499,440	1,007,760	250.26	258.47	12.32	19.69	19,630	58,640
GRAND TOTAL		17,283,400	13,833,600	31,117,000	15,498,549	2400.38	2402.50	457.57	290.89	539,350	835,240
MONTHLY AVERAGE		1,440,283	1,152,800	2,593,083	1,291,545	200.03	200.21	38.13	24.24	44,946	69,603
DAILY AVERAGE		58,193	46,578	104,771	52,184	8.08	8.09	1.54	.98	1,816	2,812

FIG. 4—RECORD OF MATERIALS USED

coremaking, chipping and grinding, miscellaneous labor, cost of iron, coke and foundry supplies, hauling, miscellaneous charges including repairs to tools and buildings, watchman and janitor service, storing and shipping patterns, office force and light, heat and power. In the last column the total cost per 100 pounds of castings is entered. By making casting comparisons from month to month, increases and decreases will be found which necessarily should be explained. We will first compare the items of molding, coremaking, chipping and grinding, which are considered the productive labor of the foundry, and some of the practical reasons for increases and decreases in these items will be outlined. A comparison of the bad casting percentage with that of the previous month will undoubtedly disclose a good reason for an increase in cost, as a one per cent increase in this item is equivalent to a decrease in the output of one per cent. This would not only increase the cost of productive labor, but would also increase all other items entered on this report. The average weight of castings made also has a tendency to increase the average cost. If the average weight of castings one month is 50 pounds, and if this average drops to 40 pounds the succeeding month, an increase in the cost of the

MONTHLY COMPARATIVE COSTS PER 100 POUNDS
COST IN CENTS

MONTH	YEAR	MOLDERS	CORE-MAKERS	CHIPPERS AND GRINDERS	MISCEL. LABOR	IRON	COKE AND FOUNDRY SUPPLIES	HAULING	MISCEL. CHARGES REPAIRS TO TOOLS AND BUILDING	WATCHMEN AND JANITORS	STORE AND SHIPPING	PATTERNS	OFFICE	LIGHT HEAT POWER	TOTAL COST DOLLARS
JAN.	1900	56.5	14.6	11	31.1	75.4	11.4	.6	18.2	2	2	4.1	4.2	6.1	2.372
FEB.	"	66	14.5	12.1	35.1	75.8	12.9	.7	19.5	2.1	3.1	2.5	4.4	5.5	2.540
MAR.	"	70.7	17.5	13.5	37.8	77.1	10.6	.4	17.6	2.4	3.1	2.8	4.8	5.6	2.639
APR.	"	66.1	15.3	12.4	35.3	75.3	9.8	1.6	18.7	2.2	2.4	3.5	5.2	5.1	2.529
MAY	"	76	17.1	15.2	38.6	77.8	14.2	.9	21.3	2.4	2.5	5.8	5.3	6.4	2.835
JUNE	"	78.3	17.3	15.3	40.1	81.3	13.2	.8	29.9	2.4	3.5	5.3	4.9	6.7	2.990
JULY	"	71.2	14.3	15.2	35.1	83.8	12.6	.7	26.4	2	2.4	4.5	4.1	6.5	2.788
AUG.	"	72.8	11.4	14.2	33.5	88.1	13.5	1	25.5	2.2	1.9	2.8	4.2	7.1	2.782
SEPT.	"	71.9	12.9	14.1	33.8	83.1	16.7	.6	20.6	2.2	1.9	5.4	3.6	8	2.748
OCT.	"	68	11.3	13.7	30.2	86.9	14.6	.6	20.9	1.9	1.2	3.7	3.5	7.2	2.637
NOV.	"	65.1	11.5	13	29.5	81.3	12	.5	23.6	2	3	3.4	3.8	7.1	2.558
DEC.	"	61.3	11.4	13.3	29.1	88.8	13.7	.5	25.3	2.1	2.5	4.3	3.6	6	2.619
YEARLY AVERAGE PER 100 POUNDS		68.4	14	13.4	34	81.3	12.9	.7	22.2	2.1	2.5	4.1	4.3	6.4	2.663

FIG. 5—MONTHLY COMPARATIVE COST REPORT PER 100 POUNDS OF GOOD CASTINGS PRODUCED

lighter work is naturally expected. The average rate paid per hour is also an important item which must not be overlooked when increased production costs are being considered. The item of miscellaneous charges includes such labor as cupola tenders, department labor, unloading material from cars, cranemen, blower room employes and men handling patterns. Causes for increases in the items constituting this division will undoubtedly vary from month to month, owing to the miscellaneous line of work included and the reasons can best be explained by the general foreman who is constantly in touch with these departments.

For example, during the month it might be found that the cupola men are hauling iron which was placed in the extreme corner of the yard when received, thereby requiring a longer time to haul it to the furnaces or cupolas and this necessitated the employment of extra men. Furthermore, a large stock of material might have been received during the month, such as sand, pig iron, scrap, fire clay, limestone, etc., which would necessitate extra labor for unloading the cars. Furthermore, the tonnage might have decreased, yet it is probable that all of the cranemen will be required at a certain time of the day and this will prevent a reduction in this force.

The column in which is entered the cost of iron, includes both pig iron and scrap, and in the adjoining column is entered the cost of coke, core material and foundry supplies, which includes all other materials required in the production of castings, such as sand, plumbago, coke, limestone, charcoal, fire clay, parting compounds, etc. These items cannot very easily be controlled as they are governed by the prices that must be paid for them. The cost of iron and scrap will vary according to the mixtures used. The cost of hauling, storing and shipping, light, heat and power, are largely controlled by the amount of work that is being done, and the greater the output the lower the average cost, particularly of office help, watchmen, janitors, etc. Under the item of hauling it will be found that repairs will have to be made from time to time, although the cost of watchmen and janitor service will not vary greatly, nor will the cost of the office force vary to any marked extent from month to month. With a small output the cost will naturally increase per 100 pounds, and, of course, the cost decreases as the output increases.

We will now consider the item of miscellaneous charges which includes repairs to tools, buildings, etc. In this column all expenses that cannot be included in other divisions must be charged. Repairs to tools include repairs to wood and iron flasks, sand mixers, molding machines, cars, trucks, ladles, tumbling mills, expense of the repair crew, as well as repairs to the buildings, benches, shelving, fences, runways, tracks, etc. In this division is also included other charges such as the cost of patching and filling defective castings, grinding chisels for cleaners, cost of making lifting plates, arbors, etc., and the daily freight and express charges on incoming materials. This item of miscellaneous charges should be watched closely as all repairs and replacals are absorbed in this sub-division. Many repairs can be made when the output of a foundry is large as the increased tonnage will hold this miscellaneous cost item to a reasonable figure. However, if the output is decreasing, such repairs which are possible with a large tonnage must be held over until the conditions are more favorable. The cost of pattern changes and repairs are entered in one column and it is also advisable to increase the amount of this work when the output is large as this will decrease the average cost of this work. The total cost per 100 pounds of good castings represents the cost of all labor and material required in the production of the month's output. The average cost per 100 pounds for one year is entered in the lower column of Fig. 5.

A curve sheet, compiled from the data entered on the report sheet, Fig. 5, is shown in Fig. 2. It will be noted that this sheet covers a period of 18 months, but can be extended to any length to cover a number of years. It will be noted that the average cost of iron and scrap, from January to August, 1900, greatly increased, but fluctuated during the succeeding five months. From the middle of December to the middle of March the cost of iron did not materially change, but a sharp decline was noted in April. The cost of molding was exceedingly variable, as indicated by the curve. This chart will prove exceedingly valuable to the manager of a plant as it shows at a glance the increases and decreases in the various items.

Fig. 6 is a record of miscellaneous data which will prove exceedingly valuable. A column is provided for the number of working days in each month, as well as the total number of working days in the year. A column is also provided for the total tonnage of iron melted. It will be noted that the average monthly total aggregates 31,117,000 pounds of iron melted. This should be considered 100 per cent. The output of good castings averaged 20,425,419 pounds per month, which was equivalent to 65.6 per cent of the total amount of iron

MISCELLANEOUS RECORDS

MONTH	YEAR	WORKING DAYS	TOTAL IRON MELTED	TOTAL IRON OUTPUT	PER CENT OF OUTPUT AGAINST IRON MELTED	AVERAGE WEIGHT OF CASTINGS MADE POUNDS	DAILY AVERAGE OUTPUT POUNDS	BAD CASTINGS POUNDS	PER CENT BAD
JAN.	1900	25	2,751,250	1,828,611	66 7/10	102	73,144	179,614	8 9/10
FEB.	"	22	2,608,870	1,732,700	66 4/10	127	66,642	186,321	9 7/10
MAR.	"	26	2,248,450	1,457,502	64 8/10	77	66,250	183,911	11 2/10
APR.	"	25	2,650,100	1,806,230	68 1/10	95	72,249	237,667	11 6/10
MAY	"	25	2,637,330	1,632,145	61 8/10	87	65,286	211,374	11 4/10
JUNE	"	24	2,983,210	1,551,241	51 8/10	98	64,276	186,978	10 7/10
JULY	"	27	2,738,160	1,869,490	67 3/10	96	69,240	161,103	7 8/10
AUG.	"	25	2,380,670	1,600,400	67 2/10	61	64,016	151,016	8 6/10
SEPT.	"	25	2,492,200	1,616,033	64 8/10	50	64,641	171,208	9 5/10
OCT.	"	26	2,853,160	1,866,904	65 4/10	45	71,804	161,214	7 8/10
NOV.	"	23	2,274,160	1,678,950	73 8/10	78	72,998	142,210	7 9/10
DEC.	"	24	2,499,440	1,785,213	71 4/10	102	74,384	177,487	9
YEARLY AVERAGE		297	31,117,000	20,425,419	65 6/10	83	—	2,150,103	9 5/10
MONTHLY AVERAGE		24 3/4	2,593,083	1,702,118	—	—	—	179,175	—
DAILY AVERAGE		—	104,771	—	—	—	68,772	7,239	—

FIG. 6—SHEET CONTAINING MISCELLANEOUS RECORDS OF FOUNDRY OPERATIONS

melted. The average monthly total of bad castings amounted to 2,150,103 pounds, or 9½ per cent of the total melted; thus, 75.1 per cent of the total iron melted is accounted for and the difference, amounting to 24.9 per cent, is not accounted for and represents melting losses, returned metal, gates, etc. It will also be noted that the average weight of the castings made is entered on this report and it will be found that this item will prove exceedingly valuable inasmuch as it has a considerable bearing on the output percentage as against the total amount of iron melted. These records can be varied to meet the requirements of any foundry, regardless of size.

Coal-Handling Crane

The Northern Engineering Works, Detroit, recently completed an interesting crane installation for handling coal and ashes at the boiler plant of the King Paper Co., Kalamazoo, Mich. Coal is delivered to the plant in cars over an elevated siding outside of the boiler room, as shown in Fig. 1, and is discharged from the cars by a bucket suspended from an electric traveling crane having a span of 42 feet and a lift of 50 feet. The crane runway is 422 feet long and extends into the boiler room, as illustrated in Fig. 2. An opening in one end of the boiler house, as illustrated in Fig. 1, is provided to admit of the passage of the crane and the bucket. The coal is discharged into the pit at the side of the track, where it is stored for future consumption.

FIG. 2—INTERIOR VIEW OF BOILER PLANT, SHOWING ELECTRIC TRAVELING CRANE AND BUCKET WHICH SERVES THE COAL HOPPERS

The crane is of the three-motor type and operates a grab bucket having a capacity of 1½ cubic yards. The hoisting speed is approximately 75 feet per minute and the bridge travel of the crane, 350 feet per minute. The coal is carried from the car directly into the boiler room and is dumped into hoppers over each boiler, as shown in Fig. 2. From the hoppers the coal is fed into the boilers by automatic stokers. The opening in the end of the building, which is provided for the passage of the crane, is closed by special steel doors. The crane construction is exceedingly novel, the operator's cab being directly attached to the crane trolley, but to the side of the crane, as illustrated in Fig. 2. By this arrangement the effective trolley travel is not reduced. The crane hoist is provided with dynamic and large and powerful electric solenoid brakes, together with suitable automatic circuit breaker and limit stops, take-up devices, etc. The gearing is of steel construction and the bearings are of bronze. The crane is equipped with an automatic weighing device which records the weight of the coal in the grab bucket. The trolley is covered and the cab is suitably enclosed for outdoor service. This hoisting and conveying installation, including the crane hoist, bucket, scales, runway, etc., was built by the Northern Engineering Works, Detroit. A bucket of the Williams type is used. Daniel J. Albertson, Kalamazoo, was consulting engineer and architect for the entire plant.

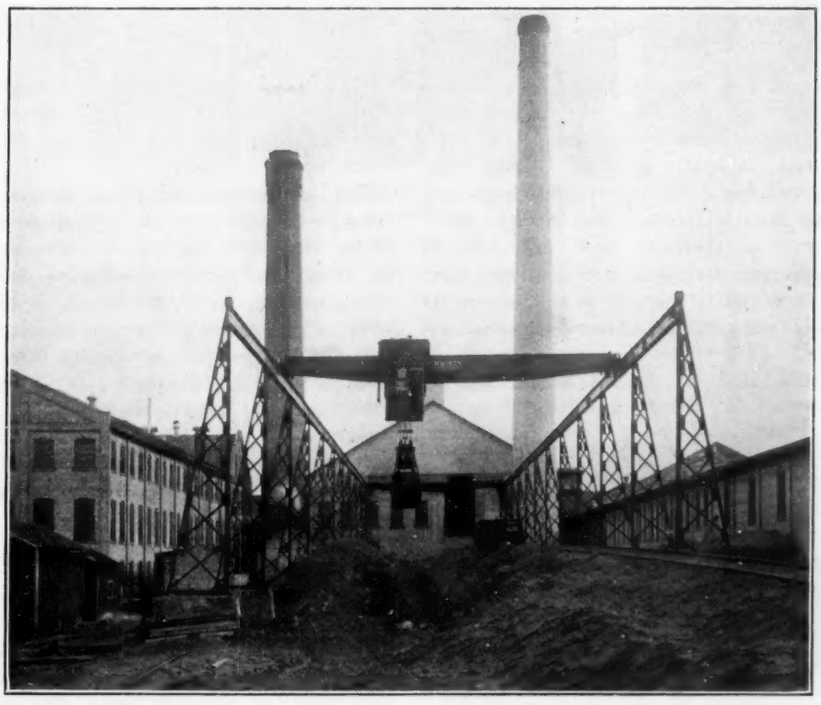


FIG. 1—YARD CRANE FOR UNLOADING COAL FROM CARS FOR BOILER PLANT

Leo G. Smith has resigned his position as general superintendent of the steel foundry department of the Londondary Iron & Mining Co., of Londondary, N. S.

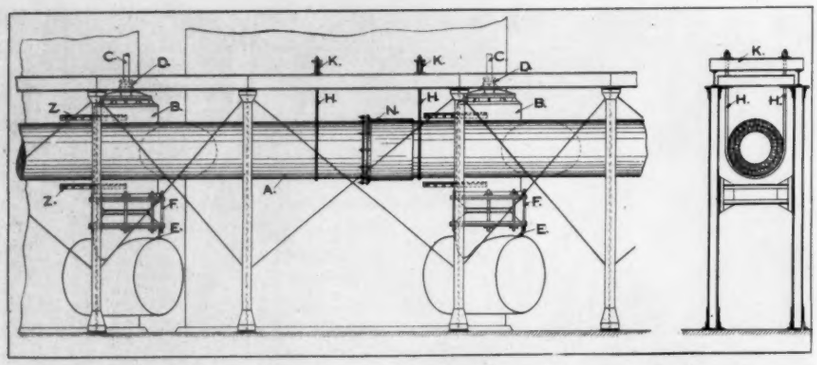


FIG. 1—ELEVATION AND SECTIONAL VIEW OF FURNACE HOT BLAST MAIN

Scott Expansion Joint for Hot Blast Mains

By George H. Smith

Every furnace superintendent, at some time or other in his career, has experienced difficulties arising from the expansion and contraction of hot blast mains. The hot main, *A*, Fig. 1, is made of steel plate lined with fire brick. It connects with the stoves through the valve chamber *B*. The valve is of the water-cooled, mushroom type suspended by a stem, *C*, which is guided by a stuffing box, *D*, at the top of the upper chamber *B*. This top chamber is independent of the lower chamber *E*, the valve seat being held between by bolts *F*.

Before starting the blast furnace the valves are all accurately suspended and perfectly seated, but when the hot blast is turned into the main the steel expands and immediately the chambers, *B*, are pulled out of their vertical positions in the direction of the expansion. There has been no way of remedying this trouble and leaks ensue necessitating new valves, seats and stems, to say nothing of the time lost in changing these parts. Also, until they are changed, the hot blast man has his own troubles with the valve due to the binding effect resulting from their leaning position. Again, the brick lining and the steel with different co-efficients of expansion, add other difficulties.

The old method of supporting the main by pipes was very crude and even the present method of built-up supports is objectionable because they are not very pleasing to the eye after the expansion of the pipe has pulled them with it and has caused them to incline in the direction of the expansion.

James Scott, superintendent of the Lucy furnaces, of the Carnegie Steel Co., Pittsburgh, has had a great deal of trouble keeping up valves and valve seats, especially so when making manganese products, due to the high temperature required. Mr. Scott endeavored to eliminate these difficulties by applying expansion joints to the main. These joints have been in use on the hot main at Lucy furnace No. 2 for the past two years and up to the present time have given no trouble themselves, but have completely overcome all previous difficulties.

The joint is constructed as shown in Fig. 3. The main is split and the riveted sleeve, *S*, is riveted through bar *R*, to one side of it at *G*. On the other side, at *T*, another riveted plate ring, *U*, of smaller diameter than the sleeve, *S*, is riveted, leaving a packing space between the two. A continuous, square steel ring, *O*, is put in place at this point when erecting the joint and after erection, asbestos rope packing is inserted in the packing space on each side of this bar. Another square, steel ring, *J*, in two pieces to permit of its removal, is inserted ahead of the gland, *M*. These rings allow the sleeve to work on them instead of on the packing and beside acting as a guide, take considerable load off the packing and prevent its being crushed. There is also an angle, *V*, which is riveted to the sleeve, *S*, and through this angle extend bolts, *W*, by means of which adjustment is made to the angle, *M*, which forms the gland.

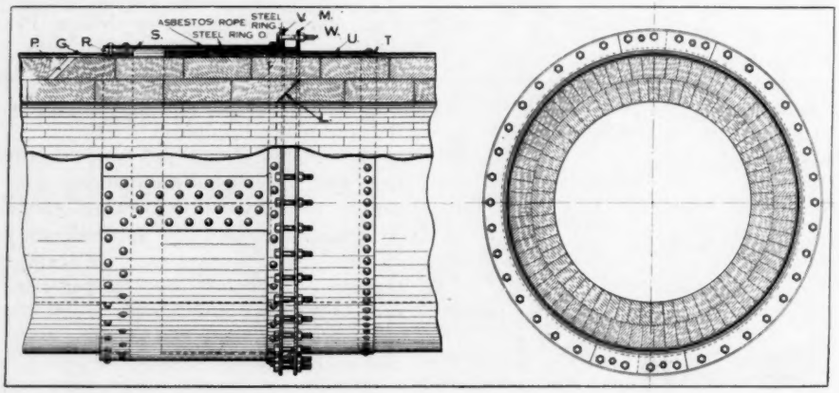


FIG. 3—SECTIONAL AND PLAN VIEWS OF THE SCOTT EXPANSION JOINT

This expansion joint was designed not only to take care of the expansion of the steel pipe, but also to allow for the creeping of the brick lining as well. This creeping of the brickwork occurs when it is cooled. Fine dust filters into the cracks and when the brickwork is again heated, there is a second expansion and more trouble. It is necessary to take care of this and in order to do so the brick are constructed as shown in Fig. 3, *P* and *L*, with bevel ends.

The expansion joint is shown in position at *N*, as part of the hot main, in Fig. 2. This illustrates, also, the method of supporting the main at the Lucy furnaces. The columns with the longitudinal girders are shown as well as the round bar hangers which are suspended from the cross girders. This

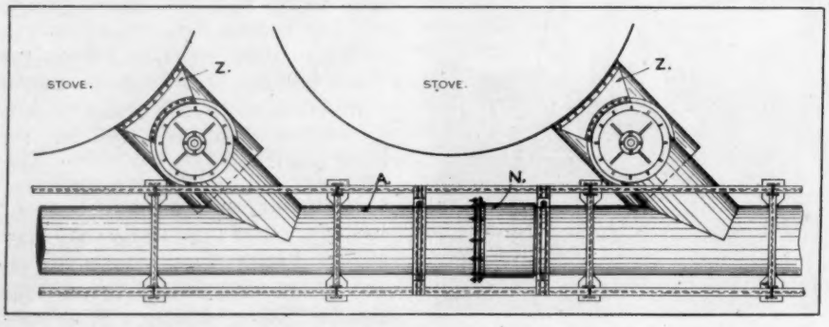


FIG. 2—PLAN VIEW OF HOT MAIN, EQUIPPED WITH A SCOTT EXPANSION JOINT

method of support permits of the easy adjustment of the entire main and also insures a free sliding motion to the expansion joint.

In Fig 2 the hot main is shown with the joint, *N*, in position between the valve chambers. The expansion between these chambers is taken up in this joint and no strain is put on any part of the line As a precaution against any possible sticking of the joint and to insure absolute perpendicularity of the valve chambers, two gusset plates have been inserted between these chambers and the stoves as shown at *Z*, Fig. 2. The width of the gusset between the chambers and stoves is ample and permits of a flexibility in a vertical direction when it is necessary to raise the upper chamber to remove the valve seat. From experience with the use of this joint on the hot blast main, and considering the saving in repairs and lost time, it may be readily seen that these joints would prove just as efficient if applied to gas mains.

New Facing and Boring Machine

The Rochester Machine Co., Rochester, N. Y., is now building a new type of facing and boring machine, shown in the accompanying illustrations. While the machine illustrated in Figs. 1 and 2 is built especially for double facing, these machines are built also for boring and facing or for facing only. The castings, which were finished on the machine shown, were faced inside and outside at the same time. The two facing arms are located in different planes and are of different lengths. The short arm is designed to extend into the casting and faces the inside while the long arm is performing the outside facing operation. As the surfaces machined are not continuous, intermittent cutting is required. The tool holder is arranged to permit of feeding at right angles in either direction. It can also be swiveled to any desired angle and is graduated to facilitate setting.

All gears and operating parts are fully enclosed and the worm and worm gear for the drive operate in oil. Starting, stopping and changing of speeds are controlled by one lever, conveniently located for the operator. A variable speed motor is used. The slowest speed of the machine illustrated is 1½ revolutions per minute and the highest speed is 12 revolutions per minute. The large arm will face up to 50 inches in diameter and the small arm 30 inches in diameter. The entire machine and motor are mounted on one base. This machine is arranged for use with another tool, which, in this case, was a Rochester horizontal boring machine. This facing machine was placed on the floor plate of the boring machine and the two tools worked simultaneously on the same castings. When the machine is built both for boring and facing, a spindle up to six inches in diameter can be used for boring. The spindle has separate bearings in the housing and is driven by spline keys fitted into the sleeve on which the main driving gear is mounted. Speeds and feeds can be arranged to suit special requirements.

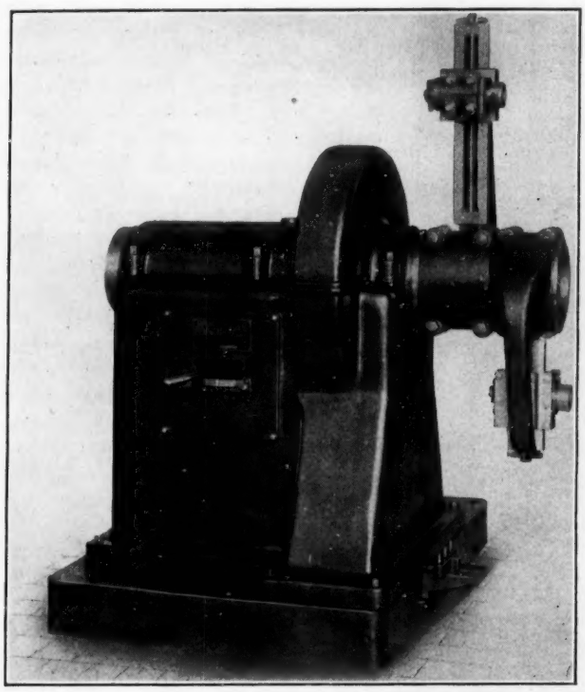


FIG. 1—OPERATING SIDE OF COMBINED FACING AND BORING MACHINE

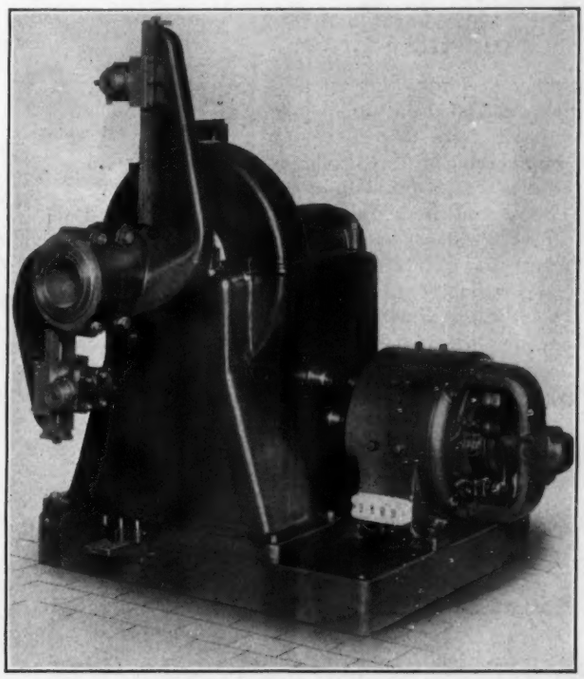


FIG. 2—ANOTHER VIEW OF THE FACING AND BORING MACHINE, SHOWING THE ARMS AND THE MOTOR

Gary By-Product Coke Plant

H. Koppers, constructor of by-product coke and gas ovens, Joliet, Ill., has issued a large folder which contains a panoramic view of the Kopper's ovens erected at Gary, Ind., by the Indiana Steel Co., a subsidiary of the United States Steel Corporation. Eight batteries of 70 ovens each are illustrated, the total installation comprising 560 ovens. Each oven has a capacity of 12¾ tons per charge. The ovens are of the regenerative type equipped with the Koppers' direct process of ammonia recovery. The coking time is 18 hours and the daily coal consumption is 9,500 net tons and the yield 84 per cent or 8,000 tons of coke. The by-products consist of ammonium sulphate and tar. The gas evolved amounts to 95,000,000 cubic feet daily, of which 50 per cent is used in the Gary steel mills and the other 50 per cent is utilized for heating the ovens.

FIG. 1—SINGLE MOTOR SELF-PROPELLING CRANE

A Single Motor Self-Propelling Crane

In the accompanying illustrations is shown a self-propelling single motor railroad crane, built by the Browning Engineering Co., Cleveland. This machine is adapted for light hoisting operations and is being installed in the yards of plants which have only a limited use for cranes and hoisting apparatus. The machine illustrated in Fig. 1 was supplied to the Wisconsin Coal & Dock Co. for use in loading coal from storage piles to cars in its yards at Superior, Wis.

The machine is operated as a crane and is propelled by a motor, which is controlled by one man. It has a maximum lifting capacity of 15 tons at a 10-foot radius and 2½ tons at a 40-foot radius. The draw bar pull of the machine is about 7,600 pounds, which enables it to handle six or seven cars on a level track. The motor is of the Westinghouse direct-current type, built especially for crane service. It has a heavy frame horizontally split so that all parts are easily accessible. The shafts are extra large and strong and the area of the commutating service is ample. High starting torque and low fly wheel effect permit the quick starting, stopping and reversing required by the service. The motor is rated at 50 horsepower, 220 volts and 470 revolutions per minute. A detailed view of the motor connections and the crane and operating mechanism are shown in Fig. 2. A standard, reversing drum type Westinghouse controller and grid resistors are used for controlling the motor.

Ore-Drying Tests at Mine No. 3 of the Pequest Co., Buttsville, N. J.

Test No.	1.	2.	3.	4.	5.
Temperature of atmosphere, deg. Fahr.	73	74	76	78	88
Temperature of ore mined, deg. Fahr.	59	59	59	59	60
Temperature of ore discharged, from dryer, degrees, Fahr.	116	126	122	135	185
Temperature of fan exhaust, deg. Fahr.	120	130	114	124	
Per cent of moisture in ore mined, all-day average	22.4	22.4	22.4	22.4	23.29
Per cent of moisture in material discharged from dryer	8.0	3.1	9.3	10.1	8.34
Per cent of moisture in material after standing 24 hours in office	4.3	1.6	7.9	8.5	.....
Amount of material fed to the dryer in tons per hour	5.447	6.607	7.611	5.890	17.59
Time, minutes	60	75	60	45	60
Rate per hour, tons	5.447	5.29	7.611	7.83	17.59
Fuel oil burned, gallons	18.00	26.81	23.75	18.24	67.5
Fuel oil burned per ton of ore delivered to dryer in gallons	3.30	4.06	3.12	3.10	3.83
Pounds of water in one ton of ore as mined	448	448	448	448	405.80
Pounds of water in ore as discharged by dryer	135	50	159	174	145.05
Pounds of water evaporated per ton of ore delivered to dryer	313	398	289	274	260.75
Efficiency of performance, per cent	87.55	89.05	87.31	85.87	71.04
Tons of ore to be mined per ton of dried ore delivered	1.186	1.249	1.169	1.159	1.149

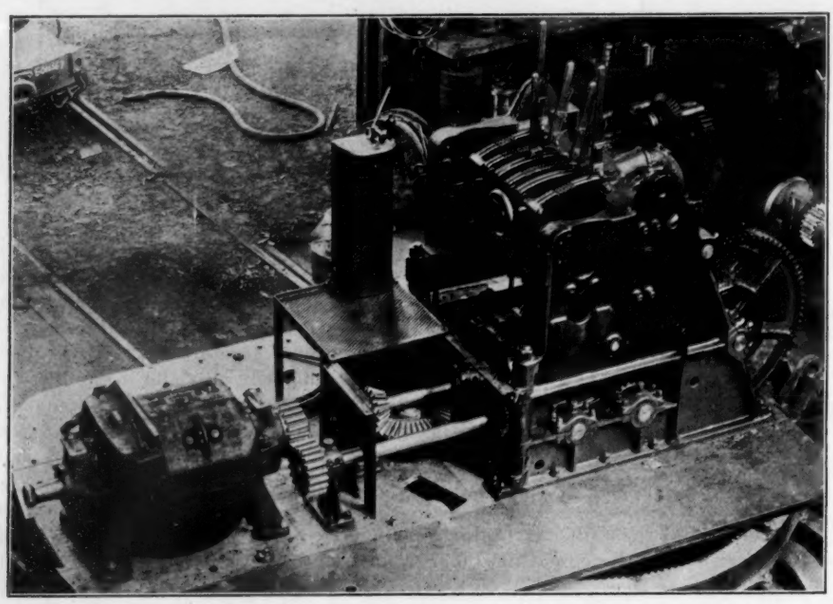


FIG. 2—OPERATING MECHANISM, SHOWING THE MOTOR AND OPERATING LEVERS OF THE SINGLE MOTOR SELF-PROPELLING CRANE

Drying Wet Iron Ore

The drying of wet iron ore which later can be charged into the blast furnace in the form of nodules, effects great economies as the interstices between the nodules reduces the resistance to the blast offered by fine ores when charged wet. In reducing the moisture, for example, from 21 to 8 per cent, the ore is discharged by the dryer in nodules varying in size from peas to marbles. The method of drying consists in passing the ore through a double shell dryer. The material enters the space between the shells at the meed end and the movement of the dry, together with its inclination, carries the ore to the discharge end. In the meantime the ore has been subjected to hot gases which have passed through the inner cylinder. A recent test of drying wet ore with a Ruggles dryer at the Pequest Co.'s mine No. 3, Buttsville, N. J.,

gave an efficiency of 89.05 per cent. The dryer was installed in the open and was driven by a vertical steam engine which operated the dryer as well as the fan. By increasing the speed of the fan the capacity of this type of dryer is increased in almost the same ratio. An increased price was obtained for the iron ore in this dried form. The results of a series of five ore-drying tests are given in the accompanying table:

Book Review

Metallurgy; by Herbert Lang; 255 6 x 9-inch pages; illustrated. Published by the McGraw-Hill Book Co., New York City, and furnished by THE IRON TRADE REVIEW for $3, net.

This work will be divided into three volumes, the first of which has recently been issued. It is the intention of the author to group the subjects so that each of the three volumes can be considered separately and yet the subject of the three will follow in logical sequence. The first deals primarily with the simpler and more obvious matters of metallurgy. In the effort to attain unity in the first volume it was found necessary to include discussions of the crushing process, which is preparatory to almost all of the other processes. Courses of treatment described are those of current practice. The essay on the smoke of metallurgical works treats of a subject which might be supposed to concern only fumes of smelting works. In reality, however, it is of much wider scope. The subject is given the broadest possible treatment and includes a discussion of smoke of all kinds.

Ore crushing is given extended treatment and chapters are included on ore sampling, valuing ores, metallurgical tabulations, the roasting of ores, the smoke of metallurgical works and sulphur smoke.

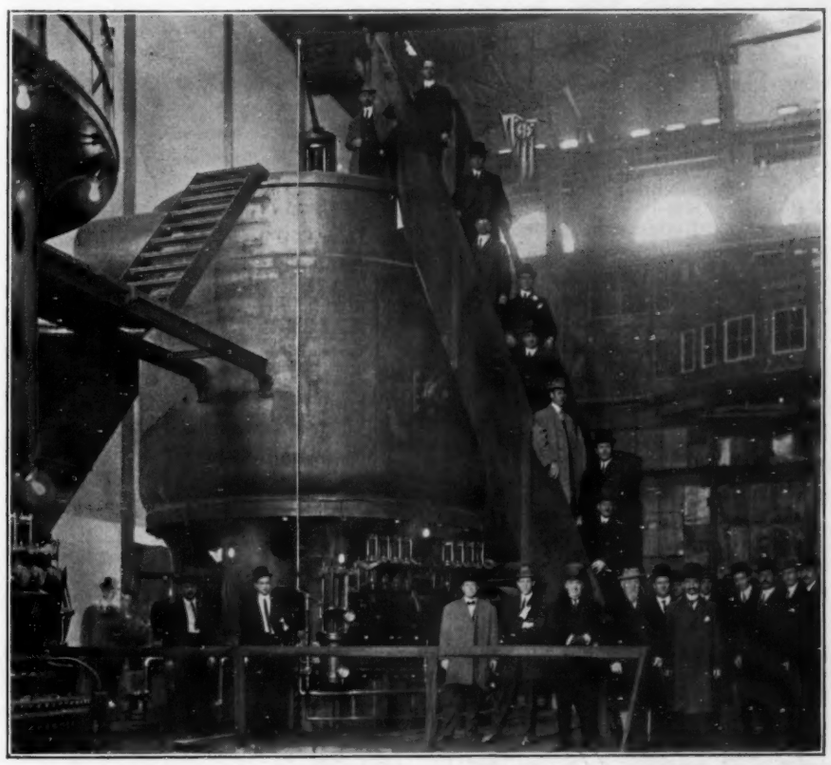
World's Largest Steam Turbine

The largest steam turbine ever installed in a central station was recently placed in operation at the Waterside station No. 1 of the New York Edison Co., in New York City, in the presence of a number of distinguished engineers and men prominent in electrical circles. This unit is the first of three 20,000-kilowatt, Curtis turbines which will be installed in this station to do the work at present performed by 11 vertical steam engines, each of 3,500 kilowatts capacity. The single turbine now installed will replace four of these engines.

The unit is of the vertical type and both the turbine and the generator which it drives have a capacity of 20,000 kilowatts, or nearly 30,000 horsepower. The shaft carrying the revolving element of both turbine and generator is supported by a step bearing, to which oil is supplied at a pressure of 950 pounds. The total weight of the revolving parts is approximately 223,000 pounds.

The turbine is of the six-stage type, each stage containing a single wheel that carries two rows of revolving buckets. Between these rows there is a single stationary, re-directing row supported by the casing. The machine is designed to operate at 175 pounds gage pressure, with the steam superheated 100 degrees Fahr., and to exhaust to a vacuum of 28½ inches. The generator is four-pole, 25-cycle, three-phase, designed to operate at a potential of 6,600 volts and a speed of 750 revolutions per minute.

The base contains a large part of the tubes forming the surface condenser, thus permitting the direct discharge of steam upon the tubes without piping or bends. The overall height of the installation is 35 feet, 7 inches, and the base is 17 feet, 7 inches by 17 feet. The complete unit was built by the General Electric Co. at its Schenectady, N. Y., plant.



LARGE STEAM TURBINE RECENTLY PLACED IN OPERATION AT THE WATERSIDE STATION NO. 1 OF THE NEW YORK EDISON CO.

Armor Plate and Gun Tubing

A low carbon steel for armor plate and gun tubing, recently patented, has the following composition: Carbon, 0.15 to 0.25 per cent; molybdenum, 1 to 2 per cent; nickel, 5 to 7 per cent; tungsten, not more than 3 per cent, and manganese, less than 0.7 per cent. The proportions of molybdenum and nickel are stated to be sufficient to compensate for the deficiency and strength of the steel due to the low percentage of carbon. The metal cannot be hardened by quenching while hot, but must undergo cementation, and by regulating the treatment it is possible to bring some parts of the plate to a state of great hardness, while other parts remain soft and ductile. These qualities are of great value in armor plate. In the case of gun tubes, an increased resistance is obtained to the bursting effect of the shock of the discharge.

James Doyle, superintendent at the Pullman works, Pullman, Ill., died at Detroit, Dec. 4, heart failure being the cause.

The Chevrolet Motor Car Co., Detroit, has increased its capital from $100,000 to $2,500,000.

Report of the Annual Meeting of the A.S.M.E.

Practical Discussions of the Many Valuable Papers Presented—Proceedings of the Gas Power Section

The annual meeting of the American Society of Mechanical Engineers opened on the evening of Dec. 5, in the Engineering Societies building, New York. The feature of the opening session was the address of the retiring president, Col. E. D. Meier, president of the Heine Safety Boiler Co. Col. Meier's subject was "The Engineer and the Future." In it he traced the development of engineering as a science and showed how, in the earlier times, it was confined largely to the military, and how the term *civil engineer* came into being when the engineering of municipal and other work not strictly military, passed out of the hands of army engineers.

Presidential Address.

Col. Meier referred briefly to the immense influence engineering had on the present-day civilization and concluded his address as follows:

The forces and materials we employ in our manufactures have long been and still are the subjects of most careful analysis and experimentation, to find their precise load capacity and endurance. The study of the living force and of that highest and most costly material inherent in the workman has but recently begun. But already several promising theories are undergoing exhaustive tests on a large scale. Psychological study prescribes a humane basis for them all as the condition of success.

The unrest in the modern world has its basis in an underlying sense of injustice. The growing sense of community of interest, the knowledge of our dependence on each other, the ever-expanding humanitarianism, are all founded on scientific facts, and are becoming world movements. They fervently answer Cain's question, "Thou art thy brother's keeper."

The engineer is responsible for the vast increase in appliances to meet every demand of that most voracious of living beings, man. The mass of mankind needs to be educated to understand; and as the crude dangers and fears of the earlier centuries vanished, so the prejudices and superstitions of the dark ages must be swept away.

If our future professional brethren do their duty, and we know they will, the golden rule will be put in practice through the slide rule of the engineer.

Following the conclusion of the president's address, the president-elect, Dr. Alexander Crombie Humphreys, president of Stevens Institute of Technology, was escorted to the platform and introduced to the members of the society.

Professional sessions began on Wednesday morning. Three papers were presented, entitled respectively, "The Turret Equatorial Telescope," by James Hartness; "Expense Burden: Its Incidence and Distribution," by Sterling H. Bunnell, and "Standard Cross-sections," by H. de B. Parsons.

A New Telescope.

Mr. Hartness's paper describes a new type of astronomical observatory which was designed to protect the observer from the cold to which he is exposed in most of the observatories now in use. It accomplishes this purpose by the use of a revolving turret for the polar axis of the instrument, making the instrument and building integral. By this change in scheme of mounting it has been possible to avoid the use of the large reflecting mirrors employed in all previous designs where the comfort of the observer has been the controlling motive.

The problem in making an observatory of this kind is to maintain an equal temperature within and without the telescope tube, in order to avoid establishing disturbing air currents, and of course it is necessary to receive the beam of light coming from any object above the horizon.

In all previous work at least one relatively large plain reflector has been used to change the direction of the beam of light from that in which it comes from the celestial object to the fixed direction requisite for the eyepicce. In the present instrument the eyepiece has a slight motion, and, therefore, does not possess the ideal feature for comfort of the observer that is possessed by the previous instruments, but by sacrificing a trifle in this respect it has been possible to avoid the use of a large mirror. The point at which the direction of the cone of light is changed is about one-quarter of the distance from the ocular to the objective; this gives an area of about one-sixteenth of mirrors located near the objective. This is so small that it is possible to use a prism instead of a mirror, although even with a mirror it would be a distinct gain.

The paper includes a description of the means for heating and ventilating, and also touches on the delicate subject of patent rights for scientific instruments and the adverse effect to science of the present policy of allowing such things to go unprotected by patent rights.

In his paper on "Expense Burden", Mr. Bunnell said:

Correct cost-keeping is taking rank with the problems of construction in the work required of the engineer. Factory burden, an important item of manufacturing cost, is to be regarded not as waste, but as the continuing outlay for the maintenance of the active concern. High or low ratios of burden to direct or prime cost give no direct indication of the degree of operating efficiency. Burden items should be analyzed in detail and allocated to the various producing units of the factory, so that the cost of maintaining, operating and supervising each unit may be known and charged as a time rate against the cost of each item of work passing through the unit. The method of procedure is illustrated in connection with a small machine shop. The normal running expense or burden is scheduled, and accounting methods are suggested by which the efficiency of the management in keeping expense in agreement with the schedule, may be shown. The net result of such a rational method of distributing expense burden is to stabilize the cost of product against the effect of temporary changes in the expense schedule, while providing a definite standard of running expense as a measure of the efficiency of the supervising department.

Discussion of Expense Burden.

Discussing this paper, H. F. Simpson said that accounts are of value only when efficiently used and that to this end competent and specific directions of operation are essential. If these have been issued to the worker and are backed up by such personal explanation as is necessary by reasons of the defects in his personal ability to apprehend, the performance of the act itself is likely to be highly efficient. Any one attempting to devise a system of records or to audit an existing one, should first call for the directions which had been given and confine himself to paralleling these with records. If such record did not give adequate information, he should request that directions initiating the acts on which information was desired, should be formulated for him as a basis for his own work. The chief function of accounting should be the detection of flaws in the execution of plans rather than the formation of a basis for the original formulation of the plans themselves.

Mr. Parsons presented a number of

conventional cross-sections for mechanical drawings which he offered for discussion as to their value if adopted as standards for shop use. These cross-sections were developed after communication had been established with engineers in the United States, Great Britain, France and Germany. The cross-sections presented were selected as a result of the correspondence with these engineers.

Boiler Practice.

A paper attracting wide attention was that of Prof. D. S. Jacobus, entitled "Tests of Large Boilers at the Detroit Edison Co."

The tests described in this paper were made on two boilers at the plant of the Detroit Edison Co. Each of the boilers has a rated capacity of 2,365 horsepower on the basis of 10 square feet of boiler heating surface per horsepower, and in every-day practice carry a load of 6,000 kilowatts and in the evening from 7,000 to 8,000 kilowatts. The preliminary and regular tests required that the boiler room of a large power house be under the control of the observers for three months and for six weeks over 50 men worked in 8-hour shifts night and day, exclusively on the tests. The magnitude of the undertaking may be appreciated when attention is drawn to the total quantities measured, which aggregated about 5,000 tons of coal weighed and 45,000 tons of water.

One of the boilers tested was fitted with Roney stokers and the other with Taylor stokers. The test results secured indicated that the efficiency obtainable with each stoker is about the same. The combined efficiency of the boiler and furnace varied from about 80 per cent at slightly below rating to about 76 per cent at double rating, on the basis of 10 square feet of boiler heating surface per rated horsepower. In obtaining these efficiencies the steam used for driving the stokers and for producing the forced blast in the Taylor stokers has not been deducted from the total steam generated by the boiler. The amount of steam used by the Roney stokers was about 1½ per cent of the total steam generated by the boilers, and for the Taylor stokers about 2½ to 3 per cent.

The boilers are remarkable for the great amount of heating surface in each and it was seriously questioned as to whether it was desirable to concentrate such an amount of power in a single boiler. The failure of one tube in the boiler is liable to put a large percentage of the station out of business. On the other hand, the high economy obtained with this construction of boiler, which was due in no little measure to the size of the unit which permitted large combustion spaces in the furnace, justified largely the slight risk of failure.

This paper was more widely discussed than any other presented at the meeting. Prof. William Kent said that the most notable feature of the setting was the enormous size of the combustion chamber. The boilers in Detroit have grates about 10 feet below the lowest point of the heating surface and the total height of the furnace is about 29 feet. This is good practice and worthy of being followed in the future. The size of the unit emphasizes the necessity of the best possible brick-work and tubes, workmanship of the best quality, treatment of the feed water before it enters the boiler, and the utmost precaution to prevent the entrance of oil or grease. Prof. Kent plotted the efficiencies obtained on a diagram and developed a formula for the curve of efficiency. The equation is as follows: $E = 81 - 1{:}33\left(\frac{w}{s} - 3\right)$ in which E is the efficiency in per cent, w is the pounds of water evaporated from and at 212 degrees per hour and s the square feet of heating surface. The line defined by this equation indicates approximately the ratio of the efficiency to the rate of driving for the ten best results of 16 tests. The 16 tests were analyzed by plotting them in relation to this line and it was found that six tests with the Taylor stoker were close to the line and one about 2.8 per cent below it. Four tests with Roney stokers were near the line and five from 1.4 to 2.8 per cent below it. The reasons for the deviation of these from the line of maximum efficiency were studied and it was found that the most important variable affecting the economy was the difference in the air supply. The most important conclusion to be drawn is the necessity of keeping the air supply down at high rate of driving so that the pounds of dry gas per pound of combustible does not exceed 18. When the ratio w/s equals 7, an increase in the amount of dry gas per pound of combustible from 18 to 20 corresponds to a decrease of efficiency from 73.9 to 69.9 per cent, and this drop increases much more rapidly if the quantity of dry gas per pound of combustible increases beyond 20 and w/s is increased beyond 7. The need of gas analysis to control the regulation of the air supply becomes of great importance at high rates of driving. The tests furnish data as to whether it pays to drive boilers in excess of three pounds evaporation per square foot of heating surface per hour, the approximate point of maximum fuel economy, since they show what loss in efficiency may be expected at the high rate of driving. Where coal is cheap and when boilers are to be run at maximum capacity for only a few hours a day, the loss in fuel by rapid driving may be more than offset by the reduction in interest on the investment where one boiler is made to do the work usually expected of two or more. The Detroit tests give definite figures of the reduction in efficiency due to increased rates of driving where a good grade of bituminous coal, low in moisture, is used.

Use of Large Boiler Units.

R. H. Rice stated that in his opinion the use of large boiler units is a step in the right direction, and it is gratifying to note that the large boilers forming the subject of the Detroit tests, had a high efficiency. By the use of such boilers, the fire-room force will be reduced and the complications of the plant greatly diminished. The question of maintenance, repairs to brickwork, stokers, etc., in a unit of this size remain to be settled by experience. The use of a large boiler of this character, however, introduces other problems which are not met where a battery of boilers is used to supply a unit such as a 6,000 or 7,000 kilowatt turbine. In case of the shut-down of such a unit, the blowing off into atmosphere of 75,000 to 100,000 pounds of steam is a serious matter and in such cases means must be taken to protect the boiler by the injection of a large amount of feed water to reduce the temperature. The necessity for an arrangement for an accurately graduated feed that will follow closely, the demands for steam on the boiler, so that disturbance by the feed of the steam capacity can be reduced to a minimum while maintaining the highest pressure, has been shown. In these large units, fluctuations in feed supply are likely to lead to large fluctuation in pressure when the boilers are operated as single units. Furthermore, the stresses on the boiler, due to expansion forces, will be greatly reduced by the use of such graduated feed.

Efficiency of Detroit Units.

Prof. William D. Ennis commented on the exceedingly high efficiency of the large units at Detroit. He said that a running efficiency of 75 per cent including a lay-over period of seven hours with a load ranging from rating to double rating, means a great deal in power station work.

With a turbine giving a brake horsepower on 220 British thermal units per minute, and with a brake-to-switchboard ratio of 1½, it means 26,000 British thermal units in fuel per kilowatt-hour, or about 1.9 pounds of coal. The economy was obtained at a rate as high as 7 pounds evaporation and in a city power station, the cost of land and buildings and the interest on them will be approximately in the inverse ratio of the rates of evaporation. The big boiler is efficient commercially as well as thermally.

Discussing the same paper, H. De B. Parsons said that in order to secure perfect combustion, three requirements must be observed: a surplus of air, a thorough mixture of the fuel particles in the air and a high temperature. Without perfect combustion the efficiency of the boiler cannot be high. The speaker stated that many years ago he had recommended that the products of combustion be not admitted to the heating surface until combustion was complete. The boiler at Detroit filled this practical condition. The fire is so far from the heating surface and the combustion chamber is so large that a thorough mixture of fuel and oxygen can be maintained and combustion completed before the products are compelled to pass over the water heating surfaces.

Comparison of Results.

E. D. Dreyfus compared the results obtained by Prof. Jacobus with some tests made last year, and drew the conclusion that, practically considered, the large steam plant is the thermo-dynamic equal of the gas engine. Oil engines, of course, excel, but they, along with gas engines and producers, have due limitations in the size of units. Hence the same degree of economy of labor and materials cannot be realized with the internal combustion motor, which leaves it altogether out of the domain of the large power plant. The comparison no longer holds true for small equipment, the internal combustion engine remaining quite uniform in efficiency over a wide range, while there is to be observed a large change in the steam plant with size. Dr. Jacobus's concluding remarks bearing upon the design of boilers which shall be capable of being driven to very great overloads so that the necessity of operating at low loads and even of banking fires would be removed, is of particular economic interest. It will eliminate one of the largest sources of loss in power plants and increase the handicap on the producer plant, which at present does not offer similar possibilities.

Strain Measurements of Boilers.

Under the title "Strain Measurements of Some Steam Boilers, Under Hydrostatic Pressures," James E. Howard described some hydrostatic tests, which were made upon two horizontal tubular boilers which had been in service for a period of 27 years. Gaged lengths were established on different parts of the boilers by means of holes 10 inches apart and about 0.05 inches in diameter, reamed to a conical shape. The deformations of the boilers at different pressures were determined by a 10-inch micrometer strain gage with conical points to fit the reamed holes laid out on the boilers. The paper gives by means of diagrams and illustrations the strains occurring at the locations where measurements were taken; and for the sake of comparison, stresses were computed using a modulus of elasticity of 30,000,000 pounds.

Herringbone Gears.

This was followed by a paper by Percy C. Day, entitled "Herringbone Gears." From a practical standpoint, herringbone gears have been less satisfactory than straight cut spur gears, because, until recently, no method was devised for producing them with the requisite speed and accuracy. Within the past six months, a method has been found and developed in England to high degree of perfection. The distinction between these gears and the ordinary herringbone type, is that the teeth of the former instead of meeting at a common apex at the center of the face are stepped half the pitch apart and do not meet at all. This arrangement of the teeth does not affect the action of the gears, but it facilitates their commercial production and admits the use of precision methods in their manufacture. The paper described in considerable detail the action of gears and the herringbone gear in particular, and then discussed production methods of the common type and of the Wuest gear, which forms the subject of the paper. A large section of the paper was taken up with a discussion of the possibility of the application of these gears to various lines of work, including steam turbines, geared hydraulic turbines, rolling mills and rod mills, machine tools, pump driving, mining and elevators. Concerning the use of these gears in rolling mills the paper reads as follows:

There are two advantages in the use of accurate herringbone gears for this class of work. The absence of shock in transmission renders breakages much less frequent than with cut spur or molded helical gears. The even transmission and entire elimination of vibration allows the finishing rolls to be gear-driven for the finest work without showing gear marks on the finished product. Herringbone geared mills run with very little noise. This may be of less consequence in rolling mills than in most other applications, but it is an improvement. Rod mills, with their qualities of high-speed gearing, can be completely transformed by using herringbone gears and mill pinions.

The field for accurate herringbone gears in connection with machine tool driving is too extended to be considered in detail. For individual motor drive this gear gives a positive transmission which is free from vibration and less noise than so-called silent chains or rawhide pinions, while there is no trouble from slipping belts or slack chains. But the real advantage of these gears lies in the better finish that can be obtained when they are used for the entire main transmission, and in the higher output combined with reduced maintenance which they give to heavy machine tools. Chatter is eliminated. Even the speeding up to the wheels of grinding machines has been successfully accomplished. Reversing gears for heavy planers are a revelation to those familiar only with the ordinary spur drive.

Papers on Cement.

Simultaneously with the session on boilers, there was held a session devoted to cement, at which three papers were presented, entitled respectively, "Confirmation of the Advantages of Electricity to the Cement Manufacturer," "Electrical Power in Cement Plants," and "The Dust Problem in Portland Cement Plants and Its Solution." The first paper, which was by J. D. Porter, of Philadelphia, showed the effects on costs of manufacture of the electric drive on cement-making machinery, and discussed the character of electrical apparatus best suited to meet conditions of the cement industry. This apparatus comprises turbine-driven generators and induction motors arranged for individual motor drive. The paper, "Electrical Power in Cement Plants," by F. H. Lewis, of Birmingham, Ala., presented arguments as to the disadvantages of electric power. The main points made by him were that in an electrically-driven plant the initial cost is higher, often being as two to one when compared with a

steam driven plant, the operating cost is excessive and the overload capacity limited.

Otto Schott, of New York, in his paper on the "Dust Problem in Portland Cement Plants," described a number of dust eliminating devices, after which he discussed the removal of the dust from the waste gases escaping from the drying drums for raw material and coal.

In regard to the economy of dust elimination, the author cited the case of a dust eliminating plant installed in a particular factory at an expenditure of $4,500 with an outlay of $750 per year for power and $250 for repairs. The expense of this plant was covered in six months by the cement collected by it and saved from the dust.

Gas Power.

The annual meeting of the gas power section of the society was held Thursday morning, simultaneously with a professional session. Prof. R. H. Fernald, retiring chairman of this section, in his address, reviewed the progress in gas power during the year and outlined the developments which could be expected in the near future. Among the notable achievements commented on by the chairman, was the adoption of Diesel engines, for the new steamers being built in Germany. The first paper of the morning was read by H. R. Setz, entitled "Oil Engines." Starting with the older well-known types of oil engines, which were the natural sequence to the gasoline engine. this paper proceeds to give a description of the Diesel engine and its modifications, commonly known under the collective name of constant-pressure engines. This description is given in the form of a critical discussion, leading up to an explanation of the principles underlying the various processes of fuel injection. Particular attention is given to the development of smaller units.

The author supplemented his paper with some curves, showing the relative economy of the Diesel engine, and other types of petrol and gas engines. These curves show clearly the points of load at which it is uneconomical to use the Diesel engine. In the discussion which followed, Prof. Breckenridge inquired as to the maximum thermo-dynamic efficiency possible with the Diesel engine. Mr. Freyn replied that the efficiency based on the indicated horsepower was about 45 per cent and with a mechanical efficiency of 80 per cent, the thermo-dynamic efficiency based on brake horsepower became 33 to 36 per cent. Continuing, Mr. Freyn cautioned against too great enthusiasm in regard to the possibilities of the oil engine. It was reported that many firms formerly building steam and gas engines were taking up the manufacture of the oil engine and not having proper experience in this line, were bound to involve themselves in trouble.

Discussion of the Oil Engine.

Another speaker seconding Mr. Freyn's remark on this subject, expressed his doubt as to the desirability of the oil engine in large units. It was stated, in regard to the lack of experience being apt to make trouble for the builders, that the fits, clearances and other allowances necessary to steam engine practice, are now largely matters of common knowledge, but that the same knowladge in regard to the oil engine must be acquired by a series of expensive experiments or more expensive engine-room failures. In connection with Mr. Setz's paper, a paper by Forrest M. Towl, was read and discussed at the same time. Mr. Towl's subject was, "The Test of an 85 - Horsepower Oil Engine." The paper describes a test of a De La Vergne oil engine, FH type, operating an oil pump, and one of the same engine under the same conditions, but with the load applied by a prony brake instead of a pump. The object of the test was to find the friction of the pump and gearing and the efficiency of the plant. Data of test and results of computations are given. The pump and transmission efficiency were 92.1 per cent, the total station efficiency, 25.52 per cent, and the duty per 1,000,000 B. T. U., 198,664,000 foot-pounds.

Small Gas Engines.

Following these papers, Prof. Wm. D. Ennis presented a highly mathematical contribution, entitled "Design Constants for Small Gasoline Engines," which was passed without discussion.

Prof. Ennis stated that common rating formulae consider piston displacement as the only variable. The expression $\frac{Cd^2}{26{,}000}$ is suggested for brake horsepower at 1,000-feet piston speed. The factors influencing the value of C are examined quantatively, and its probable limits are found to be 5,970 and 11,008 for a 4-cycle cylinder, depending on the design and operation. These limits correspond to the range of mean effective pressures, 55 to 90 pounds. An attempt is made to develop a more general expression which shall include the effect of piston speed variations. The form of this expression is brake horsepower $= \frac{Cd^2 fS^e}{24{,}200{,}000}$ in which there may be employed the tentative values $f = 1.85$, $e = 0.9$. The internal-combustion motor, unlike a steam engine used for traction, can develop full power only at full speed. The steam locomotive can furnish a maximum horsepower output even at very low velocities, by using a late point of cut-off. When an automobile must run slowly against heavy resistances, as in hill-climbing, the large amount of power required necessitates high piston speed and gear reduction. As with the steam locomotive, the tractive force is (within certain limits) approximately independent of the piston speed. We may make independent assumptions as to tractive force and car velocity for one condition only. These being fixed by requirements, the horsepower, cylinder dimensions and gear are also fixed. For any other reequirements, if the resistance be prescribed, this fixes the gear ratio at maximum output (which corresponds to maximum piston speed) and the corresponding car velocity may be computed from the resistance and horsepower. If on the other hand, the velocity is prescribed, the gear ratio (for maximum power and piston speed) is at once fixed, and this determines the tractive force.

Gas Engine Operating Costs.

The final paper of the section described the tests, construction and working costs of a 1,000 kilowatt natural gas engine. The paper was the joint product of E. D. Dreyfus, of the Westinghouse Machine Co., and V. J. Hulquist, of the American Locomotive Co. The substance of this paper centers about the manner in which the testing of a large gas engine in commercial service, was successfully conducted, and is supplemented by data relating to the economies realized in both construction and operation. In view of the care necessary to obtain dependable results, it is shown how all observations were critically taken in order to minimize the "personal" and "instrumental" error which may appear in such work. Parts of the paper, dealing strictly with the examination for errors, have been abridged in publication. A typical plot is, however, included. All important details of the tests are embodied, together with the precautions followed in the use of the various measuring instruments. The simplicity of the plant details, and the facility in starting and stand-by service, are also evidenced. As a final measure of the value of the in-

stallation, the cost of producing current with this type of equipment has been determined, including all operating expenses and charges incident to the investment.

In the slight discussion which followed the presentation of this paper, Prof. W. D. Ennis gave a short historical review of the conditions leading up to the design of the engine. It was first decided to design an engine to operate on natural gas, but which could also be operated on producer gas if the natural gas supply became exhausted or so expensive that it would be more economical to use producer gas. Mr. Moultrop called attention to the extremely low operating costs, that among them a particularly low overhead. Mr. Dreyfus explained that these figures were low on account of local conditions.

The election of H. J. Freyn, of the Illinois Steel Co., Chicago, as chairman of the section for the coming year was announced.

Foundry Practice.

On Thursday morning, "The Core Room, Its Equipment and Management", was discussed by Henry M. Lane, of Cleveland, who supplemented his address by the presentation of numerous microphotographs of core sands and views of core room apparatus. The paper dealt with the subject of foundry cores and core room practice under the following headings: Core room location and arrangement; core sands and core binders, selection and compounding of core materials; core ovens and core drying; core pasting; core handling and core storage; core machines and core room rigging. Investigation of the subject has been made through the assistance of many firms and individuals interested in securing a more uniform product from the foundry and one of higher quality. A considerable portion of the work was done at the laboratory of the Robeson Process Co., Covington, Va., where extensive experiments were made on core sands and binders. The object of the paper was to show mechanical engineers that it is possible to meet their requirements in the production of castings, but that to accomplish this result core room practice cannot be based on rule-of-thumb methods; instead, it must approach the precision and certainty to be attained by the introduction of laboratory methods.

Augustus M. Kelly, foundry superintendent of the American Blower Co., in discussing the paper, told how he had used, for purposes of economy, an inferior grade of oil and a ratio of 50 parts of sharp sand to one of oil. This was good for a time, but when the molds were poured, a great deal of oil was burned off. The ratio was then reduced and more thorough mixing in a sand mixer was followed. This produced good results and reduced the ratio to 80 of sand to 1 of oil, which proved the most satisfactory for all cores. Considerable water was added to make the cores stand when green, but this cannot be done unless the sand is mixed in a mixer. Mr. Kelly spoke of the great difficulty of obtaining men to ram the sand properly. To overcome this problem, he invented a machine which is attached to the core bench and handles the boxes for irregular cores. This machine jar-rams the sand, rolls over the core box and plate, and lifts the core box, leaving a perfect core on the plate. This machine solved the problem of inexperienced help, made more and better cores and at a reduced cost.

Thos. D. West, in a written discussion, emphasized the importance of grinding, especially sand, used in making steel castings. Alexander E. Outerbridge, of Philadelphia, in a submitted discussion, said it might be of interest to know that large cores are now made by machine with unskilled labor in one quarter the time required by hand. Moreover, ordinary "heap sand" is used, without the addition of loam, flour, or any other binder. He mentioned some large cores that had been recently made in this way, one being 8 feet long, 20 inches wide, 16 inches deep and weighing with rods, about 2,500 pounds each, and other cores 3½ foot square, weighing 3,000 pounds each. He predicted that this was only the beginning of the end of making cores by hand. On the subject of core testing, Mr. Outerbridge said:

In core testing, the ordinary transverse testing machine for breaking cast iron test bars has been employed a number of years in our foundry. As a general rule, especially in testing the transverse strength of all sand cores, a dozen test cores, 1 x 1 inch x 15 inches, are made from a batch of sharp sand and pure linseed oil, in the proportion of 1 part of oil to 30 parts or 60 parts, or even 100 parts of sand. An equal number of cores are made in the same core box from a batch of sharp sand and any other oil to be tested, using the same proportion of oil and sharp sand. These test cores are placed side by side on an iron plate and baked under identical heat conditions, the numbered cores alternating on the plate. When cold, they are broken on the testing machine at uniform rates of speed and it is surprising to note how little variation in strength occurs in breaking cores made from the same batch of oil sands showing that the method is reliable. The variations in the temperature of the oven will cause variations in the strength of the cores made from one batch of sand baked at different times, but this source of error is avoided by the plan used.

Mr. Outerbridge suggested the importance of maintaining the quality of the oil and of guarding against the substitution of mineral oils for pure linseed oil. He referred to the process of instantaneous detection, which he had outlined at the last meeting of the American Society for Testing Materials.

Herman A. Becker told of a simple method of saving time in some jobs by using cores to form certain parts of the work in ordinary green sand molds. Several stereopticon lantern slides were presented, showing this method in detail.

Core Oven.

B. D. Fuller, of the Westinghouse Electric & Mfg. Co., of Cleveland, in a written discussion, described a design of oven for drying large cores or molds which has given excellent results. This design is one where the fire box is in the pit and the heat is conducted under the floor of the oven from the rear to the front, then up into the oven and back through the cores or molds to the flues, which are also in the rear of the oven. The mistake is often made, he said, in not building a sufficiently large fire box and in cramping the flue area underneath the floor, thus compelling the forcing of fire, which not only does not give satisfactory drying results, but burns out the fire box, grate box and flues. E. H. Mumford, of the Mumford Molding Machine Co., Plainfield, N. J., described a typical arrangement of a bench jolt rammer in a core shop with the aid of a lantern slide.

Sand Blast Tests.

The paper "Tests of a Sand Blasting Machine" was presented by Prof. Wm. T. Magrudder, of Ohio State University, Columbus. This paper gives the records and results of quantitative tests of a sand-blasting machine under the actual conditions of commercial practice. The rough surfaces of pieces of cast iron, which had been cast in one mold, were blasted by air, from which the moisture had been separated, with dried and screened new Cape May grit by a Pangborn sand-blasting machine, and with the sand valve wide open. The quantity of air used was measured by a pitotmeter; the quantities of iron removed, of sand used, and of sand consumed, were measured for each test. The air pressure was varied from 20 to 70 pounds. The angle between the surface of the test

bar and the nozzle was varied from 30 to 90 degrees. The distance from the nozzle to the test bar was varied from 4 to 10 inches.

The results show that for a distance of 8 inches and angle of 45 degrees, the equivalent amount of free air delivered per minute, the iron removed, the sand discharged, the sand used up, per 100 cubic feet of free air flowing per minute, vary directly with the pressure; the amount of usable sand remaining and the amount of sand discharged per pound of iron removed vary inversely with the pressure; for 60 pound pressure and 8 inches distance, the largest amount of iron was removed and the least amount of sand was required to do it, when the angle between the nozzle and the work was from 45 to 60 degrees; for 60 pounds pressure and 45 degrees between the nozzle and the work, the largest amount of iron was removed and the least amount of sand was required to do it, when the distance was 6 inches. The sand used varies with the directness of the blast and inversely with the distance from the test bar.

Discussion of Sand Blast Tests.

F. C. Brooksbank, of the Tilghman-Brooksbank Sand Blast Co., Philadelphia, wrote that in his experience any pressure greater than 25 pounds was a waste of power. He said the real value of sand blast came from the velocity at which it is delivered. He thought the removal of iron referred to in the paper was impractical and that the purpose of the blast was simply for the removal of sand and oxide or scale.

J. M. Betton, of New York, stated that it was well known that the best result came from the use of a sand blast held 6 inches from the work and at an angle of 45 degrees. He thought that the experience outlined in the paper might be considered an argument against the use of high pressure.

The opinion was also expressed in another discussion that the striking blow is the effective force in the use of the sand blast and that the most effective use of it is that arrangement which can impart the most kinetic energy to the sand stream. For this reason, the large sized grains are better.

Die Castings.

The paper "Die Castings", prepared by Amasa Trowbridge, Hartford, Conn., was presented by title only. The committee on meetings announced that it desired full discussions to supplement the paper and written discussions to be sent in later were requested. The paper contains a brief summary of the state of the art of making small castings in steel molds. The principles are outlined of this process of casting and of hand and automatic casting machines. The composition and characteristics are given of the metals best adapted for use with reference to the effect of temperature and shrinkage, together with examples of comparative cost.

Power Transmission.

"Variable Speed Power Transmission" was the subject of a paper presented by Geo. H. Barrus, of Boston, with the collaboration of Chas. M. Manly, of New York, and is summarized as follows:

The paper describes a variable-speed power-transmitting mechanism called the "Manly Drive," and a series of efficiency tests on the same, conducted by Mr. Barrus. The mechanism is fundamentally a hydraulic device, which consists of a pump attached to the driving shaft, one or more fluid pressure motors on the driven shaft or shafts, the latter being placed in any desired location with reference to the driving shaft, hydraulic connections between pump and motor, and a single operating lever. The fluid used is ordinary machine oil. When the operating lever is moved to its extreme position at one end, the driven shaft revolves in the same direction as the driving shaft and at its highest speed. When the lever is moved to its extreme position at the other end, the driven shaft revolves in the opposite direction at its highest speed. When the lever occupies a central position the driven shaft comes to rest and the machine acts like a brake. When it is gradually moved from either extreme position towards the center, or from the center towards either extreme, the speed is gradually changed in a corresponding degree, either forward or backward. These changes occur without varying either the speed, or direction of motion, of the driving shaft. Furthermore, as the speed of the driven shaft decreases the torque increases in like proportion. The tests covered a range of speed of the driven shaft varying from 105 to 350 revolutions per minute, and the efficiency of transmission, the percentage which the power delivered by the drive bore to the power received, averaged 87.7 per cent.

A special committee on textile industries made its first report at the Friday morning session in the shape of a paper on "The Development of the Textile Industries of the United States—A General Statement of Its Present Conditions." The paper, while supposedly devoted to the textile industry, opened a field for discussion which applied to a wide diversity of manufacturing industries. Chief among the subjects brought up in the discussion, were the subjects of driving of machinery.

In discussing the electric drive, as one of the subjects brought up by the paper, the usual advantages of unobstructed light, freedom from dust and greater cleanliness in the workroom, were pointed out by the advocates of the individual motor drive. Those in favor of belt driving maintained that all these advantages were secured in a textile mill by a system of under-driving, that is, power being taken from a line of shafting along the floor, below the machines and driving up to the machines by means of short belts. In regard to the obstruction of light, due to belting, it was maintained that unless the ceiling was depended upon as a reflector, the presence of horizontal belts close to it made but little difference.

Coming to specific systems of electric driving, the group system and the individual motor drive received considerable attention. One speaker cited an instance where calculations had been made for the installation of both types of drive in a mill and the cost of the individual motor appeared prohibitive, as compared with the comparatively few large motors required for the group drive. It was pointed out, however, that, when the cost of shafting, couplings, pulleys, hangers and belting was included with the motor cost for the group drive, its total cost was very nearly the same as that of the equipment for the individual motor drive. If there should be added to this the extra friction load, required for the driving of the long lengths of shafting and belting, the balance is well in favor of the individual motor drive.

Belt and Motor Drive.

Continuing the discussion along this line, one speaker stated that one of the reasons why the motor drive was claimed to be preferable to belt drive, was the alleged inefficiency of belting. He called attention, however, to the papers on belting presented in earlier meetings by Fred W. Taylor and Carl G. Barth. The rules laid down by these men for the design of belt drives called for much heavier belts than were usually provided in mills of any character. If these proportions were used in designing drives, the efficiency of belting would be fairly comparable with that of electric motors. Another point brought out at the same time was that electrical machinery was put under the care of men skilled, whereas the belts were left to the tender mercies of a loom-fixer or operative whose knowledge of belts consisted of the ability to put them on a pulley and splice the two ends together with a piece of belt lacing. Were the same care and knowledge to be ap-

plied to belts as is given to electric motors driving machinery, there would be far less complaint about belt failures.

A discussion of electric driving naturally brought up the question of the source of supply of the electric power, and quite a debate ensued along this line between advocates of central station power and the isolated plant. The governing principle as to the class of power to be used was that of cost, and it was brought out that in great measure this depended on locality. Thus, in New England, where it was necessary to maintain an auxiliary steam plant for heating purposes in the winter months, the extra investment necessary to build a plant capable of driving the mill would not add a very great burden to the entire factory, especially as the cost of power was only a very small percentage of the cost of manufacturing goods. If water power was available, the decision would be more difficult to make. In the southern states where the question of heating was of small moment, the decision was easier to make, particularly if water power was available. Charlotte, North Carolina, was cited as an instance where electric power from a central station was giving eminently satisfactory service. Practically 100 per cent of the industries in this city are driven by electricity generated at the water power plant of the Southern Electric Co. The question was then raised as to the possibility of electrifying an industry completely, as was done at Charlotte, in a city where the electricity must be generated by steam power. Reply was made to this question that low cost of electric power was simply a matter of engineering and it was stated that electric power was produced from steam-driven plants in Chicago more cheaply than it was sold in Buffalo from the water power plants of Niagara Falls. The extreme cheapness of electric power in Chicago, due to good engineering of the power stations, was shown by the fact that the street and elevated railways have found it economical to shut down their own electric stations and purchase power from the Commonwealth Edison Co.

The plans and specifications for a municipal electric lighting plant have been accepted by the city council of Fallon, Nev., and a bond issue of $15,000 authorized for its construction. The current will be secured from the government plant at Lahont Lahontan, but the city will build the power line and distributing system.

The Burlington railroad will begin work on large car shops in the spring at Havelock, Neb.

ALTER BUILDING CODE

Re-Inforcing Bars May be Rolled From Old Rails.

Following the final reading on Dec. 11, favorable action was taken on the proposed amendments to that section of the Cleveland building code relating to specifications for re-inforcing rods. The revised section, which provides that these bars may be rolled from old rails, is the result of a complaint filed with the Cleveland building inspector by the Franklin Steel Co., Franklin, Pa. This complaint was made on the ground that the amendments originally proposed would have excluded re-rolled steel.

The revised section reads as follows:

All reinforcing steel shall be tested by an approved testing laboratory, and the department of buildings may, at any time, demand that certified copies of all test records be submitted to it for examination. All steel used for re-inforcing purposes shall comply with the "standard specifications" governing the chemical and physical properties of concrete reinforcing bars, as adopted by the Association of American Steel Manufacturers, 1910.

All re-inforcing steel not rolled from billets shall be rolled from standard section T-rails, and shall comply with the physical tests specified in paragraph 2 of the above mentioned standard specifications. A complete physical test shall be made, by an approved testing laboratory, of each size of bar to be applied by the manufacturer on the contract, from each 10-ton lot or less.

These tests and materials shall be subject to the regulations prescribed in paragraphs 2, 4, 5a, 6d, 7, 7e, 7f, 9 and 10 of the above mentioned specifications.

Hot twisted bars, of high carbon steel, shall be twisted with one complete twist, in a length equal to not more than 12 times the thickness of the bar.

The department of buildings may demand the owner, builder, contractor, sub-contractor or foreman to make, or cause to be made, bending tests in the field on all grades of re-inforcing steel when in its opinion there is any doubt as to whether the re-inforcing steel is up to the standard of these regulations. These bending tests shall be those specified in the above mentioned standard specifications.

Order From Japan

A contract, involving approximately $500,000, for the entire mechanical equipment for a saw-mill and lumbering plant to be erected on the island of Formosa by the Japanese government, has been awarded to Allis-Chalmers Co., Milwaukee. According to J. F. Harrison, manager of the sawmill machinery department, the contract is for motor driven apparatus throughout, and includes steam turbines. The order is the result of a visit to the Allis-Chalmers plant made by Japanese government officials and engineers two years ago. Delivery of the order will commence in 90 days and the plant will be erected by two of the company's engineers and an erecting crew.

Ore Receipts at Lake Erie Ports

Out of a total shipment of 2,523,253 tons of ore during November, 2,385,668 tons went to Lake Erie ports, distributed as follows:

Port.	Nov., 1911.
Buffalo	225,988
Erie	114,699
Conneaut	444,297
Ashtabula	651,812
Fairport	16,109
Cleveland	486,064
Lorain	285,172
Huron	10,492
Sandusky	.....
Toledo	104,377
Detroit	46,658
Total	2,385,668

Prizes Awarded

The punching and shearing machines exhibited at the International Exposition, Turin, Italy, by Henry Pels & Co., 90 West street, New York City, were awarded two grand prix. The exhibit included nine power machines for heavy duty, and a number of hand machines. Among the power machines exhibited were a one-stroke beam shear, a beam shear combined with punch, a single ended coping machine, a large bar shear, a triple combined punch, plate shear and bar cutter, a scrap shear and a newly patented beam shear for cutting structural shapes without waste of material.

The affairs of the Vesper Safety Clevis & Malleable Iron Co., of Vesper, Wis., are now being wound up by the receiver and the business will be abandoned. The liabilities aggregate $60,000 and the assets are small beyond the physical valuation of the plant. The company was established two years ago.

The Bohm-Rugaard Rotary Engine Co. has been incorporated at San Francisco and will manufacture and sell a new type rotary engine. Capital stock is $100,000, of which $900 is already subscribed. The directors are E. A. Bohm, C. F. Kleegard, H. E. Roberts and J. J. Barnes.

IRON AND STEEL SECURITIES

Last week's trading on the New York stock exchange was attended by considerable irregularity. The assembling of Congress, the president's message, the announcement of the Wabash railroad's coming reorganization, as well as the firm money rates, all contributed to the general lowering of the price level.

Monday, with the exception of Wabash and Southern railway issues, the market was extremely dull; cotton rallied slightly. Tuesday, announcement of the coming reorganization of the Wabash railroad caused a break which extended through the entire list, but which was followed later by a partial recovery; the market was the dullest in weeks; wheat broke violently. Wednesday, stocks sold off and trading was extremely dull; foreign security markets were weak. Thursday, prices went to the lowest of the week in the late dealings; wheat again declined. Friday, prices declined further but rallied before the close; cotton was weak and lower; the grain market was heavy. Saturday, stocks sold off in the early dealings but rallied and closed steady.

Money rates last week continued high. Call money ranged between 5½ and 4 per cent, while time money ranged from 4 to 5 per cent, with stimulated demand. The actual condition of clearing house institutions showed loans decreased $45,853,000; net deposits decreased $38,281,000; total reserve $390,238,000; and the excess of reserve $11,696,250, an increase of $10,387,350. Non-member banks and trust companies showed loans increased $10,641,600; net deposits increased $12,082,400; reserve on deposits increased $1,926,700, and the percentage of reserve 18.8, unchanged. Bank clearings showed an increase over the preceding week and a decrease from the corresponding week a year ago. Commercial failures numbered 310, compared with 217 the previous week and 287 the corresponding week last year. Shares were sold to the number of 1,924,350, compared with 2,168,400 the previous week and 2,824,900 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $24,341,000, compared with $21,080,000 the previous week and $10,321,000 the corresponding week last year.

	Clos'g Quo. Dec. 9	Changes in week.	Annual Meeting date 1911		Stock Outstanding	Basis.	Dividend Last Dividend	Dividend Date Last Div. Pay
Allis-Chalmers	2⅛	— ⅞			$19,820,000		.....	
Allis-Chalmers, pr	8⅞	—3⅛	Nov.	2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	10¾	—1⅛	Feb.	1	41,233,300		1¾ Q.	
American Can, pr	91	—1½			41,233,300	7 cum.	1¾ Q.	Jan., 1912
Am. Car & Fdy	53	—2	June	29	30,000,000		½ Q.	Jan., 1912
Am. Car & Fdy., pr	117	+ ¾			30,000,000	n. c	1¾ Q.	Jan., 1912
American Loc	34½	—1¼	Oct.	17	25,000,000	5	1¼ Q.	Aug. 1908
American Loc., pr	102⅝	— ¼			25,000,000	7 cum.	1¾ Q.	Oct., 1911
American Ship	49	.....	Oct.	11	7,600,000	4	2 Q.**	June, 1911
American Ship, pr	105	.....			7,900,000	7 cum.	1¾ Q.	Oct., 1911
Am. Steel Foundries	33⅞	— ¾	Dec.	7	17,184,000		1 Q.	May, 1911
Barney & Smith	15	.....	June	6	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr	70	.....			2,500,000	8 cum.	2 Q.	Dec., 1911
Bethlehem Steel	29	—1¼	April	4	14,862,000		.....	
Bethlehem Steel, pr	58¾	+ ¼			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	43½	— ½	Mar.	21	45,000,000*	5	1¼ Q.	Nov., 1911
Cambria Iron	44	—1			8,468,000*	4	2 S. A.	Oct., 1911
Chicago Pneumatic Tool	46	+ ½	Feb.	20	6,485,800	4	1 Q.	Oct., 1911
Colorado Fuel	26	—1	Oct.	16	34,235,500		1¾ Q.	April, 1902
Crucible Steel	115⅛	— ⅛	Oct.	18	24,578,400		3½ Q.	
Crucible Steel, pr	81⅜	+ ⅜			24,463,500	7 cum.	1¾ Q.	Dec., 1911
Empire Steel	6	.....	Feb.	22	1,254,770		.....	
Empire Steel, pr	40	.....			2,500,000	6 cum.	1 S. A.	July, 1911
Fay & Egan	70	.....	Feb.	21	1,000,000	6 cum.	3 S. A.	Feb., 1911
Fay & Egan, pr	110	.....			1,000,000	7 cum.	1¾ Q.	Nov., 1911
General Electric	151½	—1½	May	9	65,179,600	8	2 Q.	Jan., 1912
Harbison-Walker	40	—5	Jan.	16	18,000,000		½ Q.	Dec., 1911
Harbison-Walker, pr	99	+2¾			9,600,000	6 cum.	1½ Q.	Oct., 1911
International Pump	33	.....	Dec.	12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	83	.....			11,350,000	6 cum.	1½ Q.	Nov., 1911
Lackawanna Steel	30	.....	Mar.	4	34,978,000		.....	
Lake Sup. Corp	26¼	— ¼	Oct.	4	40,000,000		.....	
New York Air Brake	55	.....	Mar.	8	10,000,000	6	1½ Q.	July, 1911
Niles-Bement-Pond	94	.....	Feb.	8	8,500,000	6	1½ Q.	Dec., 1911
Niles-Bement-Pond, pr	104	.....			2,000,000	6 cum.	1½ Q.	Nov., 1911
Otis Elevator Co	68	.....	Mar.	20	6,375,000	1	1 Q.	Oct., 1911
Otis Elevator Co., pr	96	.....			6,310,000	6 n. c.	1½ Q.	Oct., 1911
Pa. Steel	60	.....	May	8	10,750,000		.....	
Pa. Steel, pr	102½	— ¼			16,500,000	7 n. c.	3½ S. A.	Nov., 1911
Pittsburgh Coal	17	—1⅛	Feb.	10	28,104,600		.....	
Pittsburgh Coal, pr	83	— ¾			27,071,800	7 cum.	1¾ Q.	Oct., 1911
Pittsburgh Steel Co., pr	101	.....	Oct.	31	7,000,000	7 cum.	1¾ Q.	Sept., 1911
Pressed Steel Car	32	—1¾	Feb.	15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	100	.....			12,500,000	7 n. c.	1¾ Q.	Nov., 1911
Pullman	158	— ¾	Nov.	8	120,000,000	8	2 Q.	Nov., 1911
Railway Stl. Spring	31	— ½	Mar.	2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	98½	—4			13,500,000	7 cum.	1¾ Q.	Dec., 1911
Rep. Iron & Steel	23	.....	Oct.	18	27,191,000		.....	
Rep. Iron & Steel, pr	82	—1⅛			25,000,000	7 cum.	1¾ Q.	Jan., 1912
Sloss-Sheffield	39	—3¼	Mar.	15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	112	.....			6,700,000	7 n. c.	1¾ Q.	Oct., 1911
U. S. Pipe & Fdy. Co	15	+ ¼	June	28	12,106,300		1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	48¾	+2¼			12,106,300	2	1¼ Q.	June, 1911
U. S. Steel	62	—1⅞	April	17	508,302,500	5	1¼ Q.	Dec., 1911
U. S. Steel, pr	108¾	— ¼			360,281,100	7 cum.	1¾ Q.	Nov., 1911
U. S. Steel 5s	101⅞	+ ⅛			463,798,000	5	.....	
Va. Iron, Coal & Coke	70	+10	Sept.	19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	64	—1	July	26	3,998,700*		1¾ Q.	Oct., 1911
Westinghouse Air Brake	153¾	— ⅛	Oct.	3	13,750,000*		5 Q.‡	Oct., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes last 1 per cent payment of 4 per cent extra.
†Stock.
‡Includes 2½ regular, 1½ extra and 1 special.

Copper Stocks.

New York. — Amalgamated Copper closed 61⅝, a net loss of 1⅜.

Boston. — Butte Coalition closed 16¾, no change; Calumet & Arizona closed 55⅞, a net loss of 1⅝; Calumet & Hecla closed 390, a net loss of 2; North Butte Mining closed 24⅜, a net gain of 1⅞; Quincy Mining closed 63½, a net loss of 3½.

Financial Notes.

The Racine Stove Mfg. Co., Racine, Wis., has increased its capital stock from $20,000 to $150,000.

The Attwood Wrench, Tool & Stamping Co., Conneaut, O., has increased its capital stock from $25,000 to $150,000.

The American Can Co. has declared the regular quarterly dividend of 1¼ per cent on its preferred stock, payable Jan. 2, to stock on record Dec. 15.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

Published Every Thursday by
THE PENTON PUBLISHING CO.,
CLEVELAND.

CHICAGO.....1328 Monadnock Blk.
CINCINNATI.....808 Provident Bank Bldg.
NEW YORK.....1115 West St. Bldg.
PITTSBURGH.....2148-49 Oliver Bldg.
WASHINGTON, D. C.....Hibbs Bldg.
BIRMINGHAM, ENG.....Princes Chambers Corporation St.

Subscription, United States and Mexico, $3.00 per annum. To Canada and Foreign Countries, $4.50. The price of copies issued three months or more previous to date of current issue will be 25 cents each. Advertising rates furnished on application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POSTOFFICE AT CLEVELAND AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP.

Copyright 1911 by Penton Publishing Co.

THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January, 1911	6,058
February	6,072
March	6,091
April	6,108
May	6,112
June	6,124
July	6,138
August	6,152
September	6,161
October	6,172
November	6,186

December 14, 1911

The President and the Trusts

The great ability of President Taft is shown to best advantage when, as in the case of his recent message on trusts, he analyzes laws and decisions and expounds his views thereon. The message was a masterly presentation from the president's standpoint, and we believe will be approved by a large majority of those who carefully consider it.

We are frank to say that we have been among those who doubted the efficacy of the recent decree of the circuit court in the case of the American Tobacco Co., but President Taft makes a very strong argument to show that the decree will accomplish its purpose, which is, not to dissolve the company into a number of weak corporations, but to prevent monopoly under the Sherman law as interpreted by the supreme court. The president, without mentioning his friend Roosevelt, replies to the criticism made by the ex-president when he says that, "Those critics who speak of this disintegration in the trust as a mere change of garments have not given consideration to the inevitable working of the decree and understand little the personal danger of attempting to evade or set at naught the solemn injunction of the court whose object is made plain by the decree and whose inhibitions are set forth with a detail and comprehensiveness unexampled in the history of equity and jurisprudence." The doubt which has been entertained concerning the decree rested on the general belief that it did not in any important way change the ownership of the stock of the American Tobacco Co. and its constituent corporations. On this point, Adrian H. Larkin, in a letter to the New York *Times*, makes some statements which strongly support the president's argument. Mr. Larkin points out that, as formerly constituted, preferred stockholders of the American Tobacco Co. had no right to vote for the election of directors, but the new plan provides that the preferred stockholders shall have an absolute right to vote, equal to that of the common stockholders. The result is that the control passes from the common stockholders to the preferred stockholders. Mr. Larkin gives a detailed statement to show that this control is by a very large majority of stockholders other than the individual defendants in the suit brought by the government. In the case of the new American Tobacco Co., 64 per cent of the voting stock is owned by others than the defendants. These facts give reasons for hoping that the expectations of the president that competition will follow, will be realized.

Towards the close of his message, the president says that now, when after 20 years of attempt at enforcement, the anti-trust law has become efficient, we hear a call for its repeal on the plea that it interferes with business and prosperity and we are advised to abandon this work of 20 years and try another experiment for another 20 years. There are, of course, some advocates for the repeal of the Sherman law, but we believe that they are few and that the great body of business men, as well as of citizens not in business, is in favor of allowing the law to stand with such supplementary legislation as may be necessary.

The Steel Corporation's Unfilled Orders

There is probably not general realization of the great change which has occurred in the unfilled tonnage of orders of the United States Steel Corporation. Market conditions have been more or less uncertain throughout the year and the successive reports of increased orders have probably been regarded in many quarters as representing exceptional showings, not to be regarded as of more than passing importance. The fact is, however, that of the 11 monthly reports made this year of unfilled orders, eight have shown gains and only three losses, and the indivdual gains have averaged greater than the individual losses.

Starting with 2,674,757 tons of unfilled orders on books at the opening of business this year, the following monthly changes have occurred:

Dec. 31, 1910	2,674,757
January	+436,162
February	+289,624
March	+ 46,758
April	—228,597
May	—105,517
June	+247,871
July	+223,027
August	+111,900
September	— 84,668
October	+ 83,011
November	+447,627
Dec. 1, 1911	4,141,955

Thus there has been a net increase in 11 months of 1,467,757 tons, or 55 per cent. It is sometimes remarked that the Steel Corporation's tonnage of unfilled orders as reported does not represent live business exclusively, as the tonnage is too large in the light of the experience of other steel manufacturers, and sometimes a large tonnage of unfilled orders is reported at a time when rolling schedules are

being made up only from day to day or week to week. Some of the independent mills find that their tonnage obligations are smaller than those of the Steel Corporation, making due allowance for the differences in productive capacity. No doubt the Corporation in making up its totals includes tonnages which according to different systems of computation would not be included, but the observation is pertinent that in many respects the Corporation's business is different in its nature from that of most of the independents, in that it sells more largely to large consumers who cover their requirements for a greater distance ahead, though of course undertaking to accept delivery only according to a specified schedule, and not as fast as the mills could ship the material. If there is a substratum of unfilled orders which does not represent live business according to the methods followed by some other manufacturers, the changes in the total tonnage from time to time are the more impressive, for the existence of such a sub-stratum would operate to decrease the percentage of change effected by a change in the total, and the 55 per cent increase now shown from Jan. 1 to Dec. 1 is all the more remarkable.

The change in the Steel Corporation's unfilled tonnage serves to differentiate the present year very clearly from its predecessor. The great buying movement, which ultimately followed the break in prices of Feb. 18, 1909, served to increase the amount of business on the books of all steel companies continuously through the closing months of 1909, so that the maximum of business on books in all cases occurred at some time in the winter of 1909-10. At that time the Steel Corporation was reporting its unfilled orders quarterly, instead of monthly as at present, the first of the present monthly reports having been made for July 31, 1910. The largest quarterly tonnage reported by the Corporation since the 1905-6-7 period of activity and extensive forward buying was for Dec. 31, 1909, being 5,927,031 tons. Steadily throughout 1910 smaller and smaller tonnages were reported, while almost as steadily (in eight months out of 11) this year increased tonnages have been reported. The spectacular swing is shown by setting the pivotal tonnages in order and computing the changes, thus:

Dec. 31, 1909.....	5,927,031
Decrease in 1910.....	2,252,274
Dec. 31, 1910.....	2,674,757
Increase in 1911.....	1,467,198
Nov. 30, 1911.....	4,141,955

The present indications point very clearly to a large gain in unfilled tonnage during the present month, the causes which were operative in November having lost none of their force this month, but being likely rather to prove still more effective. Forward buying is much heavier this month than last, and orders with specifications attached, for as early shipment as can be effected, are very materially larger than last month. We thus have the antithesis of unfilled tonnage on books decreasing continuously in 1910, to the total extent of 2,250,000 tons, and increasing almost continuously during the present year, to the extent of nearly 2,000,000 tons. While the showing made by such figures is not all-embrasive of business conditions, it is important, and its indication is so clear and precise that it should command attention.

Progress in Economizing

The latest report upon railroad earnings by the division of statistics of the interstate commerce commission has appeared and covers operations in the month of July. The preferable comparison is by per mile of road, by reason of the increase in the mileage reporting from year to year, and the figures are as follows, covering rail operations only, as ascertained before "outside operations" and taxes are considered:

July.

	1910	1911
Total op. rev.....	$971.13	$947.57
Total op. exp.....	662.99	646.26
Net op. rev.....	$308.19	$301.31

It will be observed that there is a large decrease in total revenue from rail operations, and almost as large a decrease in operating expenses, whereby the reduction in net operating revenue is relatively small. The result is that the operating ratio is reduced slightly, from 68.27 per cent in 1910, to 68.20 per cent in 1911. The difference is slight in amount but very important in principle, for as a rule the operating ratio increases as the gross revenue decreases; in other words, expenses do not decrease as fast as revenue; here we find it decreasing somewhat faster.

While the comparison of last July with the preceding July is somewhat unfavorable, except as to the reduction in the operating ratio, it is more unfavorable as compared with July, 1909, and still more unfavorable as compared with July, 1907. On the other hand, it is very favorable as compared with July, 1908.

The iron trade is not concerned so much with the statistics showing what the railroads have been doing in the past as it is concerned with the present trends. It knows what results have followed from the conditions which made the old statistics and prefers to judge by results rather than by statistics. It is, however, interested in trends. The trend of last July as to net operating revenue was very favorable in this respect, that it showed a decrease of only $7 from the preceding July, whereas the 12 months ending June, 1911, showed a decrease of $24 as compared with the preceding 12 months, and July accomplished this small decrease in face of a decrease of $24 in total operating revenue, whereas the preceding 12 months experienced its decrease of $24 in net when there was a decrease of only $2 in total operating revenue.

All this goes to show that the railroads have made distinct progress along the line of economizing, so that they are getting better results than formerly from the amount of business offered.

F. A. Halsey, editor emeritus of the *American Machinist*, has become an associate in merchanical engineering at Columbia university. Mr. Halsey will deliver a course of lectures at that institution during the winter on practical machine shop work.

QUICK WORK

Done By Wickwire Steel Co. in Getting Iron Ore From Property.

The shipment of the last cargo of ore to go out of Escanaba the past season marked a record probably unprecedented in the history of iron mining in the Lake Superior region. The ore was from the Wickwire mine of the Wickwire Steel Co. in the Iron River district of the Menominee range. It was only about five months ago that the Wickwire interests entered the Iron River country, procuring options on a number of tracts which since have been taken over under leases, yet already one of the properties—an underground proposition, at that—has become a producer. To locate ore by exploration, equip the property with machinery, sink a shaft, and send out a cargo of 3,000 tons or more, all within the period of four or five months, constitutes a remarkable achievement.

Order Department Meets

A meeting of representatives of the order department of the American Steel & Wire Co. was held in Cleveland last week. Among those who made short addresses were President W. P. Palmer, and Frank Baackes, vice president and general manager of sales. It was practically the opinion of all present that the bottom price has been reached on plain wire and wire nails, and that more satisfactory conditions will prevail soon.

Build Aluminum Plant

The Aluminum Co. of America, with offices at Pittsburgh and New Kensington, Pa., has purchased a large tract on either side of the Little Tennessee river in Tennessee and western North Carolina, and is preparing preliminary plans for a large aluminum plant and power plant for the manufacture of aluminum from the deposits of the company in Georgia and Arkansas.

Extensive repair work at the docks at Escanaba, whence is shipped all the ore from the Menominee range and part of that produced on the Marquette range, has been planned both by the Chicago, Milwaukee & St. Paul and Chicago & Northwestern companies. At a cost approximating $125,000, the upper works at the outer end of the C., M. & St. P. dock No. 1 is to be reconstructed and the ore pockets relined. A crew of 75 men will be employed on the work all winter. Another force of good-sized proportions will be engaged in similar service on the C. & N. W. docks, and particularly on Nos. 3 and 6.

Taxes Increased

Because of the re-valuation of the mining propertes by the state tax commission, resulting in an increase from $6,231,863 to $18,251,035 in the total valuation for the city, the mining companies at Negaunee, Marquette range, will pay 92 per cent of the taxes levied this fiscal year, whereas last year they paid 78 per cent. The Cleveland Cliffs Iron Co. Negaunee mine is valued at $5,950,000, as against $1,035,000, its tax increasing from $27,095 to $75,000. The Maas mine of the same company, valued last year at $375,000 and now at $4,225,000, will pay $52,800 in taxes, compared with $9,815 the preceding year. The Mary Charlotte mine of the Breitung interests last year paid taxes of $13,000; this year it will pay $19,000.

Big Locomotive.—The Chesapeake & Ohio railroad has placed a duplicate order with the America Locomotive Co. for a mountain type passenger locomotive of large size and power. The cylinders are 29 x 28 inches, the driving wheels 62 inches, and the total weight in working order 330,000 pounds. This locomotive will be identical with the two machines built by the American Locomotive Co. for this road in June and which have given excellent service. An order for two mallet articulated compound locomotives from Lourence Morques has also been entered by this builder.

Vacancies recently brought about in the sales department of Theodore Geissman & Co., Chicago, are being competently filled by the appointments of Joseph W. Thurston, formerly with the Bethlehem Steel Co., and G. Elton Studebaker, for years with the Joseph T. Ryerson & Sons Co.

The American Sheet & Tin Plate Co. will start five additional mills at its Sharon, Pa., plant on Dec. 18, placing this mill in full operation.

The International Harvester Co. has declared the regular quarterly dividend of 1¼ per cent on its common stock, payable Jan. 15.

Emporium furnace, Emporium Iron Co., was put on the active list Nov. 26.

STOCKS DECREASE

As Shown By Copper Producers' Figures Recently Made Public.

The Copper Producers' Association figures made public Dec. 8, show heavy decreases in the production for November, nearly 7,000,000 pounds, but a very heavy reduction in stocks at the end of the month of about 23,200,000 pounds. Domestic consumption and export increased nearly 11,000,000 pounds. The figures in pounds with comparisons are as follows:

	Nov., 1911.	Oct., 1911.	Nov., 1910.
Stocks prev. month	134,997,642	140,894,856	139,261,914
Production	111,876,601	118,255,442	119,353,463
Total sup.	246,874,243	259,150,298	258,615,377
Dom. con.	68,039,776	64,068,307	60,801,992
Export	67,049,279	60,084,349	67,424,316
Total del.	135,089,055	124,152,656	128,226,308
Stocks end of month	111,785,188	134,997,642	130,389,069

Foundry Plant Leased

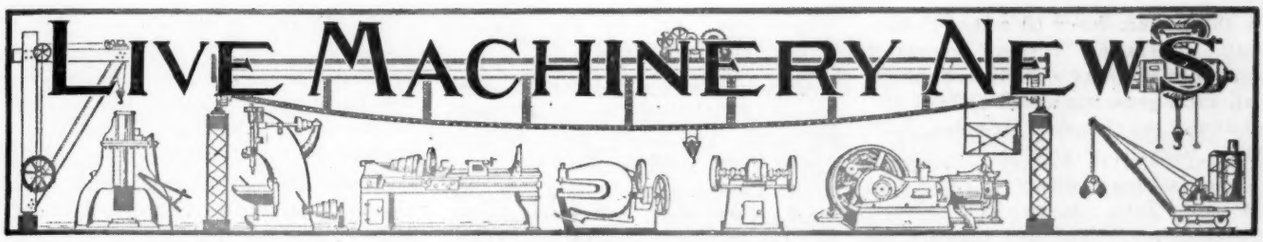
Lebanon, Pa., Dec. 11.—Leighton F. Krum has leased the buildings at Myerstown formerly occupied by the Stoever Foundry & Mfg. Co., which recently moved to Easton, Pa., and will engage in the iron foundry business. Krum's lease is for a term of five years. A stock company to be known as the Krum Foundry Co. will be organized and a charter will be applied for in the near future. The plant is to be operated by electric power and numerous changes in the equipment will be necessary.

New Bridge Plant

The Massillon Bridge & Structural Co., Massillon, O., will erect a new plant on the old site of the Republic Iron & Steel Co. in that city. It will consist of a building 156 x 400 feet, and an addition of 200 feet will be added shortly after the plant begins operations. About 275 men will be employed, and the capacity will be practically doubled in comparison with the present plant. The Massillon city officials have agreed to give $10,000 to the company when the plant is completed and in operation.

J. D. Waddell has resigned as treasurer and sales manager of the Empire Iron & Steel Co., and will be succeeded by J. C. Wicks. His successor as treasurer will be elected at the annual meeting of the board of directors in January.

Princess furnace, Princess, Va., is being relined.



The volume of machinery sales in New York fell away in some degree last week and it is not expected that business will show much improvement until after Jan. 1. A fair number of new inquiries were received in that market, but action on these will probably be delayed until after the holidays. In Cleveland, several small inquiries have been closed on lately, but the general run of business continues unchanged. A leading Cleveland machinery house advises that the volume of its machinery sales was about half of normal during September, October and November. It was reported by Cleveland dealers recently that at least two machinery lists would be submitted by railroad companies in this territory, but there now seems small probability of this business coming out in the very near future. In Chicago, buying is fair, but is limited, as a rule, to small quantities. The Bucyrus-Vulcan Steam Shovel Co. is now placing orders in that market for equipment for its proposed new Evansville, Ind., plant. In Pittsburgh, a large amount of work is being figured on and most of this will be taken up soon after the first of the year. These projects include: Two blast furnaces and four open-hearth furnaces for the Pittsburgh Steel Co., at Monessen, Pa., and three sheet mills for the West Penn Steel Co., at Brackenridge, Pa. There is a fair demand for power machinery in Pittsburgh.

Machine Tools

The Joliet Bridge & Iron Co., Joliet, Ill., is in the market for two bolt cutters and some nut tapping machinery.

The American Automobile Mfg. Co., New Albany, Ind., is installing additional machinery for the manufacture of motor trucks. George A. Buckley is superintendent of the plant. Trucks in three sizes will be built.

The Iowa Foundry & Machinery Co., Fort Dodge, O. R. Taylor, president, is planning an addition to its machine shop, 26 x 68 feet, and will probably be in the market for some additional machine tools and power transmission equipment.

The Delaware, Lackawanna & Western Railroad Co. is considering bids on a number of machine tools, aggregating about $8,000. The tools are intended for installation in the Scranton shops and will probably be closed for before the end of the month.

The city of Porterville, Cal., will call a special election to vote bonds for school work. Among the improvements a new manual training shop will be erected, to consist of machine shop, forge and other departments. The machinery for the plant is estimated to cost $3,000 by the board of education, which is in charge.

The Lehigh Valley Structural Steel Co., Allentown, Pa., advises that it has commenced work on the erection of two new steel buildings, 60 x 200 feet, which will be well equipped with the latest machinery, including one 15-ton and one 10-ton electric traveling cranes. The company's machinery was only slightly damaged by its recent fire, but the following machines will be added: Ten-inch radial drills, rotary planers, large punching and coping machines, and plate shears.

Power Plant Equipment

Norfolk, Neb., will vote Dec. 12 on the issuance of $75,000 worth of electric light bonds.

Kamloops, B. C., is considering the construction of a hydro-electric power plant of 2,000 horsepower on the Barrier river.

Manchester, Ga., will probably receive bids in February for the construction of an electric lighting plant to cost $5,000.

The Krug Brewing Co., Omaha, Neb., expects to build a new power plant, including engines, boilers, etc., at a cost of $30,000.

The Commercial Milling Co., Detroit, is in the market for an 800-horsepower, cross-compound, Corliss engine.

S. B. Vaught, financial secretary of Emory and Henry College, at Johnson City, Tenn., is receiving bids on the installation of electric light and heating plants.

The Ritchey Mfg. Co., McMinnville, Tenn., will rebuild a woodworking plant recently burned, and is now in the market for a boiler, engine and other power machinery.

The Harlan Coal Co., Harlan, Ky., is preparing to open several mines near Harlan, and will erect a power house and install conveying machinery and other equipment.

The city clerk, Two Harbors, Minn., is taking bids for a new engine to replace the one in the city lighting plant which was badly damaged.

D. C. Mullins & Son, Partridge, Ky., are planning the erection of an electric light and power plant at Whitesburgh, Ky. Equipment will be ordered shortly after the first of the year.

The Nashville, Tenn., Railway & Light Co. is reported to have the construction of a new power house under consideration for 1912. No definite details of the work have been given out as yet.

Anderson & Frankel, Lexington, Ky., are drawing the plans for a lighting plant which is being erected for the municipality of Falmouth, Ky. The appropriation for the purpose is $7,500.

The Allen Engineering Co., Memphis, Tenn., has the contract for the construction of an electric light plant and waterworks for the city of Trenton, Tenn. R. C. Houston, Memphis, is engineer.

The Jefferson Woodworking Co., Louisville, is erecting an addition to its plant and is in the market for a 90-horsepower engine. The contract for an additional boiler has already been let.

Bids on power equipment, a heating plant, a refrigerating plant and other details are being received by the board of commissioners for the proposed new $800,000 city hospital, Louisville. Bids close Jan. 4.

Power equipment will be required for the cotton oil mill to be erected at Humboldt, Tenn., by a stock company composed of J. B. Short, W. W. Baird and others. The mill was projected after a similar plant at Trenton, Tenn., was burned.

The city of Sleepy Eye, Minn., is

in the market for a 60 and a 75-kilowatt alternating current generator with field rheostat. The specifications call for a generator speed of 1,200 revolutions per minute, six-poles, 1,200 volts, 60-cycle, three-phase.

The Jackson Railway & Light Co., Jackson, Tenn., is to build a new power house. Generator capacity for 20,000 electric lamps is to be provided, and a steam turbine plant is to be installed. The cost of the improvements will be about $25,000.

The Hoke-Hill Real Estate & Investment Co., Tryon, N. C., is planning to build a hydro-electric power plant. William Farr, Asheville, N. C., and F. G. Rogers, Greenville, S. C., are the engineers. D. M. Hoke, Greenville, is president.

H. M. Byllesby & Co., Chicago, who have been investigating the feasibility of a hydro-electric project on the Cumberland river, near Williamsburg, Ky., will probably make a decision as to the proposition within the next 60 days. Surveys have about been completed.

It is reported by H. B. Lindsay, attorney for the Aluminum Co. of America, at Knoxville, Tenn., that the company will shortly begin work on several large hydro-electric power plants on the Little Tennessee river, and will also erect mills for the manufacture of aluminum.

The Lewiston & Lake Ontario Shore Power Co., Lewiston, N. Y., has filed application with the public service commission for permission to begin the construction of a power plant and distributory system under the franchise obtained some time ago. The company contemplates establishing sub-stations in Lewiston, Youngstown and Ransomville, it is understood.

The Californa state engineering department, Sacramento, has approved plans for the construction of a wharf at Union street, San Francisco, to cost $200,000. Bids for material will soon be requested. The department has also approved plans for the erection of a power plant to cost $12,000 at the Southern California State Hospital for the Insane, Patton. State Engineer Ellery is in charge of this work.

New Construction

The Maricopa, Cal., boiler works will build a new shop on the Fulton lease, near Maricopa.

The Rotary Motor Co. is taking bids on equipment for its new factory, Southside, Pittsburgh.

Bids are going in on equipment for the new factory being erected at Waynesboro, Pa., by the Waynesboro Foundry & Metal Co.

The American Sheet & Tin Plate Co. is understood to be preparing plans for adding two sheet mills to its plant at Chester, W. Va.

The Omaha Tank & Mfg. Co., Nebraska City, Neb., will erect a plant on Twenty-sixth street, San Diego, Cal., for the manufacture of steel and wooden tanks.

The Graeser Mfg. Co. has purchased property in Taggart street, Northside, Pittsburgh, and will erect two factory buildings, one two stories and the other three stories.

The Western Pacific Railroad Co. will build an addition to its freight car repair shops, Kirkham street, Oakland, Cal. Contract for the building has been awarded to E. G. Griggs, San Francisco.

The Byron Motor Co., Denver., has acquired a plant at Pueblo formerly operated by the Pueblo Steel & Wagon Co. The new owners will remodel the plant and install machinery for the manufacture of motor trucks.

The Fremont Furnace Co., Fremont, O., advises that the increased demand for its products necessitates the enlargement of its plant. This will be done as soon as the necessary plans and specifications can be completed.

James Matthews & Co., manufacturers and dealers in stencils, stamps and kindred goods, have bought property at Forbes street and Pennant place, Pittsburgh, on which a new plant will be erected.

Contracts are being awarded by the Ohio Steel & Wire Co. for equipment to be installed in its new plant at Warren, O. The general contract for the new building has been awarded to the McClintic-Marshall Construction Co., Pittsburgh.

Vanderwest & Pease, Montgomery building, Muskegon, Mich., are preparing plans for a two-story foundry, 100 x 196 feet, to be located near Muskegon. The cost of the plant is estimated at $30,000. The names of the owners have not been disclosed.

The Huntington Handle Co. is erecting a factory at West Liberty, Ky., for the manufacture of all kinds of hickory handles. W. O. Smith will be in charge of the purchase of equipment and the erection of the building.

The American Rolling Mill Co., Waterbury, Conn., has let the contract for the structural work on a new mill building to be erected on Thompson avenue. The structure will be 120 x 300 feet and one story high.

The Santa Fe railroad is said to be planning to make improvements and additions to its shops at San Bernardino, Cal. A new blacksmith shop will be erected; new machinery will be installed in other departments of the plant. The expenditure is estimated to total $250,000.

Announcement is made that the Cambria Steel Co. will manufacture horse shoes by the roll process, a new invention by two employes of that company. The company will install some new machinery for this department and is also figuring on an extension to its car building plant.

The board of education, San Diego, Cal., is having plans prepared by Quayle Bros., architects, San Diego, for a new polytechnic high school. The manual arts building will comprise woodworking, wood turning and pattern shops, machine, foundry and forge shops. The plant will be modern

The Brisco Iron Works, Porterville, Cal., recently incorporated with a capital of $300,000, plans for the erection of a plant at Porterville for the manufacture of pumping machinery. The plant will comprise machine shops and foundry, and will be fully equipped. T. A. Brisco, G. V. Reed and H. E. Redmund are directors.

The Falk Co., Mlwaukee, manufacturing steel rail specialties, frogs, crossings, etc., and operating a large foundry, has started work on a $25,000 addition to its shops in the Menominee valley at Milwaukee, to be devoted exclusively to the production of a new type of kerosene engine. The addition will be 80 x 150 feet and will conform to the present main building.

The Illinois Malleable Iron Co., Chicago, has just completed a new annealing room, 118 x 145 feet, and will erect six more annealing furnaces, thus giving the company a capacity for annealing 450 tons a week. The concern has also made an addition to its malleable foundry, 67 x 128 feet. When completed it will give employment to 260 molders. L. W. Lukens is superintendent of this department.

Announcement was made early in the week of an important change to be made in the manufacturing branch of the H. W. Johns-Manville Co., 100 William street, New York. The company has bought 200 acres in New Jersey, located on the Central railroad, near Findurne, and will remove its large Brooklyn plant to that site. It is estimated that about $2,000,000 will be spent in constructing and equipping the new building under consideration. Included in the improvements to be made are provisions for

housing the company's employes and for that purpose 200 dwellings will be constructed on the property.

Miscellaneous

La Crosse, Wis., is considering the construction of a new $250,000 water system.

Walker Bros., operating mining property in American Canyon, near Fitting, Nev., will install new hoisting machinery.

The Semet-Solvay Co., Syracuse, N. Y., expects to construct a gas plant for the North Shore Consolidated Gas Co., Waukegan, Ill., to cost about $100,000.

The Vermont Marble Co., San Francisco, has requested the board of state harbor commissioners, San Francisco, to install an electric or permanent crane for handling large blocks of marble on local docks.

The department of public works of Milwaukee closed bids, Dec. 9, for furnishing machinery and appurtenances for an electrical drive for the screw pump in the Milwaukee river flushing station.

The Wonder Gas Plant Co., Knoxville, Tenn., is planning to manufacture a machine which is to make kerosene more adaptable for lighting purposes. C. K. Vance, W. S. Needham and others are interested in the plant.

A job just completed by Westinghouse, Church, Kerr & Co., New York, is the design and construction of a steel and concrete blacksmith shop, about 50 x 150 feet, for the Winchester Repeating Arms Co., at New Haven, Conn. The side walls of this building were carried three feet above grade, the rest of the walls being glazed with wire glass in metal sash. The roof construction is of reinforced concrete with monitor having 100 per cent ventilation with metal sash glazed with wire glass. The work included also the installation of heating equipment, exhaust steam being used; the installation of three steam hammers of 800 to 2,000 pounds capacity; 22 down draft forges and the installation of forced draft and exhaust fan equipment. The hammers are served by two jib cranes having a maximum radius of 26 feet.

One of the jobs which Westinghouse, Church, Kerr & Co., 8 and 10 Bridge street, New York, have in hand for the Illinois Central railroad is the electrification of the Burnside, Ill., shops. This work includes the replacing of a number of engines located at various points throughout the plant with two 600-kilowatt exhaust steam turbine units, centrally located. These turbines are operated in connection with condensers and a cooling tower. The work also includes the installation of motors as required to replace steam engine drive; necessary switchboard, wiring, feeder system in yard for power and light; the building of a 220 x 10-foot base reinforced concrete stack with necessary flue to connect with boilers; the installation of coal-handling apparatus consisting of a 75-ton double skip hoist discharging into an elevated bunker of 150 tons capacity, when the coal is carried in traveling hopper to the various stokers in one boiler house and on a belt conveyor which supplies the boilers in another house. A vacuum system for handling ashes is also being installed.

Westinghouse, Church, Kerr & Co., New York, are constructing for the Illinois Central railroad, at Champaign, Ill., a 24-stall roundhouse, machine shop, storeroom, oil storage room, power house and office building. The power house will accommodate four 150-horsepower boilers, three to be installed at the present time; one 1,000 cubic foot compressor; boiler washing equipment, etc. The work also includes the installation of eight motor-driven deep well pumps, three cinder pits, one inspection pit, a green sand storage bin, and dryer house and equipment, lighting, heating and service equipment for the above mentioned buildings, yard lighting and power wiring, yard trench system, sanitary sewer and septic tank; one 100,000-gallon water tank, two locomotive water columns, a complete system of fire protection in yards and buildings, the design and installation of service piping between the power house and various other buildings and the erection and equipment of a transformer house. Space has been left in the power house for the installation of additional generating units when desired.

Government News

The bureau of supplies and accounts, navy department, under schedule 3,967, class 21, has awarded contract to Williamson Bros. & Co., Philadelphia, for one anchor windlass, complete with engine, for delivery at Brooklyn, at $18,250.

The bureau of supplies and accounts, navy department, under schedule 3,040, class 88, has rejected all bids for one motor-driven riveter and punch.

The furnace of the Upson Nut Co., Cleveland, will continue to operate on basic.

Keystone furnace of the Reading Iron Co. was blown in Nov. 17.

MINES RENAMED

Cleveland Cliffs Co. Alters Titles of Marquette Range Properties.

The Cleveland Cliffs Iron Co. has renamed a number of its Marquette range mines. The Kidder property has become the Jopling, in honor of J. H. Jopling, of Marquette, chief engineer of the company. The Northwestern has been given the name Francis, after a prominent official of the Chicago & Northwestern railroad. The Smith mine has become the Gwinn, this being taken from the name of the president of the Cleveland-Cliffs Co.—Wm. Gwinn Mather, of Cleveland. General Manager Murray Morris Duncan's second name has been given to the property formerly known as North Lake mine No. 1. North Lake No. 2 has been re-christened the Lloyd, afted H. Lloyd Smith, geologist. The Barnes mine is now called the Chase, in honor of F. P. Chase, of Negaunee, one of the fee owners. The Swanzy district has become the Gwinn district.

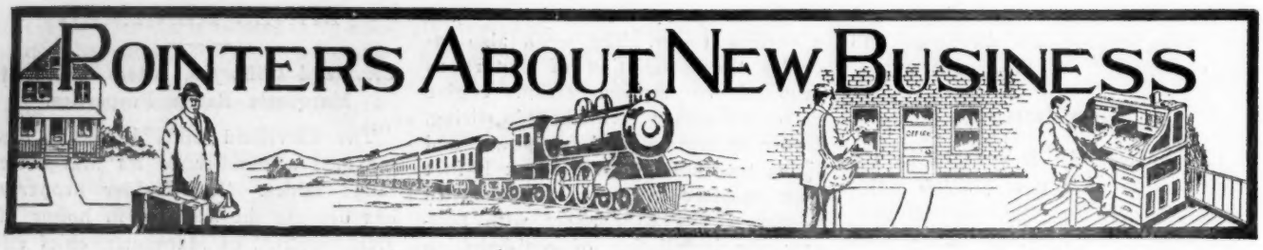
To Build Stove Plant

The Excelsior Stove Works, Philadelphia, has purchased a seven-acre site at Eureka and Sepviva streets, that city, and will erect a new plant. The stove company recently sold its old property at Third street and Montgomery avenue to the John B. Stetson Co.

The employes of Charles C. Moore & Co., engineers, held their ninth annual convention at San Francisco, Nov. 22, 23 and 24, ending their sessions with an elaborate banquet at the Palace hotel. It has long been the custom of the company to call its executive and sales department staffs together each year to discuss business policy and engineering problems and the recent meeting was one of the most successful of the entire series.

The United States Steel Corporation's big central crushing plant at Escanaba handled more ore the past season than any season since it was erected and put in commission. The tonnage ran somewhat over 200,000, contributed by mines on both the Marquette and Menominee ranges. The plant is the largest of its kind in the iron region, having a capacity of half a million tons a season.

La Belle Iron Works has declared the usual quarterly dividend of 2½ per cent, payable Dec. 31.



(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers

The following manufacturing companies have filed articles of incorporation:

The Geneme Steel Products & Supply Co., Toledo, O.; $100,000; by E. J. Marshall.

The American Metal Specialties Co., Columbus, O.; $10,000; by Arthur M. Crumrine.

The Patapsco Iron Works, Baltimore, Md.; $5,000; by Warren L. Baker, Jacob Ebert and Gordon L. Albaugh.

The Thurman Vacuum Cleaning Co., St. Louis; $150,000; by J. S. Thurman, C. V. Thurman and E. C. Towles.

The Bohm-Rugaard Rotary Engine Co., San Francisco; $100,000; by E. A. Bohm, L. Rugaard and C. F. Kleegard.

The Rose Oil Can Co., Bozeman, Mont.; $30,000; to manufacture oil cans; by Elias B. Rose and J. H. Dawes.

The Automatic Motor Plow Co., Sayre, Okla.; $200,000; by J. A. Hallum, S. P. Rogers, W. F. Carmichael and John Y. James.

The American Steel Belt Co., Pontiac, Mich.; $50,000; to manuacture steel belting; by M. M. McGrath, D. L. Davis, R. K. Cronkhite.

The Southern Harvester Co., Raleigh, N. C.; $200,000; by B. R. Jolly, M. Ashby Lambert, A. W. Goodwin, E. H. Goodwin and C. N. Goodwin.

Indiana Brass Co., Frankfort, Ind.; $10,000; to manufacture brass wares; by directors, J. A. Johnson, C. E. Williams and Celina J. Johnson.

The Universal Motor Co. of Canada, Ltd., Fort William; $1,000,000; by provisional directors, Pelimon A. Balcom, Charles Clark, Alfred Sear, and others.

Bluffton Mfg. Co., Bluffton, O.; $60,000; to manufacture tools and implements; by A. D. Lugibihl, Myron R. Lugibihl, Harley R. Lugibihl, J. E. Lugibihl and H. E. Zerhbach.

The Brantford Oven & Rack Co., Ltd., Brantford, Ont.; $50,000; by provisional directors, Edward L. Gould, Edmund L. Cockshutt, Edmund Sweet, and others.

The Soo Hardware Co., Ltd., Sault Ste. Marie, Ont.; $40,000; to manufacture hardware; by provisional directors, Chas. J. McLaughlin, W. J. McCallum, and others.

The Sterling Typewriter Co., Newark, N. J.; $1,000,000; to manufacture typewriters; by Jerome T. Congleton, Archibald F. Slingerland and Raymond E. Perrine, all of Newark.

The National Co-Operative Farm Machinery Co., Davenport, Ia.; $5,000,000; to manufacture traction engines, cotton pickers, etc.; by vice president, J. F. Appleby.

The International Typesetting Machine Co., New York; $4,000,000; to manufacture typesetting machines; by H. Ridder, J. E. Ridder and B. H. Ridder.

The East Davenport Machine Co., Davenport, Ia.; $30,000; to manufacture traction ice harvesters; by president, William Waters; vice president, John T. Campbell.

The Cleveland Copeman Electric Stove Co., Cleveland; $10,000; by J. B. Roof, Kent B. North, J. C. Rahming, Julius Bloomberg and E. E. Wolf.

The Prince Motor Car Co., Warrensville, O.; $200,000; by W. F. Kehnes, Thomas J. Atkinson, John G. Schult, E. B. Hecker and J. A. Hecker.

The Fish Marine Indicator Co., New London, Conn.; $30,000; to manufacture and deal in marine indicators, etc.; by Edwin A. Fish, New London; George E. Fellows and Lewis R. Church, both of Norwich.

The General Welding Co., Buffalo; $15,000; to do a general business of welding steel, etc.; by Edward N. Smith, Harry G. Smith, both of 444 Lincoln avenue; Chas. D. Magee, 134 Albany street, Buffalo.

The Bridgeport Engine & Equipment Co., Bridgeport, Conn.; $50,000; to manufacture and deal in engines, mill supplies, etc.; by Wm. C. Buckelen, Wm. J. Snadecki, both of Bridgeport, and T. P. C. Forbes, of Freeport, N. Y.

The Oklahoma Rolling Mill Co., Guthrie, Okla.; $75,000; to operate a rolling mill; by president and manager, James W. Arnold, South Charleston, W. Va.; vice president, C. H. Martindale; secretary, J. Humphreys, and treasurer, O. Martindale.

The Brooks Typeline Casting Machine Co., Manhattan, New York City; $25,000; to manufacture typesetting and casting machinery, etc.; by Byron Brooks, 111 Broadway; George H. Cook, 74 Broadway; and Wm. T. Hoornagle, 115 Nassau street, New York City.

General Industrial

The American Hollow Steel Sash Co., Philadelphia, has increased its capital stock from $10,000 to $200,000.

Hill-Hawkins Boiler & Tank Co., Chicago, has changed its name to Hill Boiler & Tank Co.

The large warehouse and office of the Ontario Wind Engine & Pump Co., at Winnipeg, has been completed and is now occupied by the company.

The Lebanon Valley Iron & Steel Co., Lebanon, Pa., advises that its increase in capital stock recently noted was not for the purpose of making additions or improvements.

The Detroit Edison Co., Detroit, has been authorized to increase its capitalization from $9,000,000 to $15,000,000, and to expend about $1,500,000 in improvements.

Trade Notes

The West Penn Steel Co., Brackenridge, Pa., has opened a sales office in the Chamber of Commerce building, Columbus, O., with Thomas Beard in charge.

The Galion Iron Works Co., Galion, O., is establishing offices in the Empire building, Atlanta, Ga., with Frank J. Manning in charge, and at Memphis, Tenn., with W. L. Mercer in charge. The Galion company manufactures culvert pipe and road machinery.

Fires

The Thomas Pink Co.'s machine shops at Pembroke, Can., suffered a loss of $40,000 from a recent fire. The buildings will be rebuilt at once.

Fire recently caused a loss of $5,000 to the machine and blacksmith shop of J. W. Milliken, at Sanger, Tex.